FEMI.209:405381

ORIGINAL
COMPLETED

FLOOD INSURANCE STUDY

CITY OF TULSA, OKLAHOMA

TULSA, OSAGE, AND ROGERS COUNTIES

APRIL 15, 1982

Federal Emergency Management Agency

COMMUNITY NUMBER - 405381

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Authority and Acknowledgments	1
	1.3 Coordination	2
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	7
	2.3 Principal Flood Problems	8
	2.4 Flood Protection Measures	9
3.0	ENGINEERING METHODS	16
	3.1 Hydrologic Analyses	17
	3.2 Hydraulic Analyses	20
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	21
	4.1 Flood Boundaries	21
	4.2 Floodways	22
5.0	INSURANCE APPLICATION	69
	5.1 Reach Determinations	70
	5.2 Flood Hazard Factors	70
	5.3 Flood Insurance Zones	70
	5.4 Flood Insurance Rate Map Description	71

TABLE OF CONTENTS - continued

		Page
6.0	OTHER STUDIES	90
7.0	LOCATION OF DATA	91
8.0	BIBLIOGRAPHY AND REFERENCES	92

FIGURES

Figure 1 - Vicinity Map	3
Figure 2 - Watershed Map	6
Figures 3-10- Flood Photos	10-15
Figure 11 - Floodway Schematic	69

TABLES

Table 1- Streams Studied	4-5
Table 2- Summary of Discharges	18-19
Table 3- Floodway Data	23-68
Table 4- Flood Insurance Zone Data	72-89

EXHIBITS

Exhibit 1- Watershed Unit 1	
Arkansas River	Panels 01P-04P
Watershed Unit 2	
Bird Creek	Panels 05P-08P
Watershed Unit 7	
Bird Creek Tributary	Panels 09P-10P
Coal Creek (North Tulsa)	Panels 11P-13P
Coal Creek Tributary	Panel 14P
Flat Rock Creek	Panels 15P-17P
Flat Rock Creek Tributary A	Panels 18P-19P
Dirty Butler Creek	Panels 20P-21P
Dirty Butler Creek Tributary	Panel 22P
Valley View Creek	Panel 23P
Watershed Unit 8	
Mingo Creek	Panels 24P-27P
Douglas Creek	Panels 28P-29P
Mill Creek	Panels 30P-31P
Jones Creek	Panel 32P

EXHIBITS - continued

Audubon Creek	Panel 33P
Bell Creek	Panel 34P
Bell Creek Tributary	Panels 35P-36P
Fulton Creek	Panel 37P
Alsuma Creek	Panels 38P-39P
Little Creek	Panel 40P
Quarry Creek	Panels 41P-42P
Eagle Creek	Panels 43P-44P
Cooley Creek	Panels 45P-46P
Cooley Creek Tributary	Panels 47P-48P
Tupelo Creek	Panels 49P-50P
Tupelo Creek Tributary	Panel 51P
Brookhollow Creek	Panels 52P-53P
Brookhollow Creek Tributary	Panel 54P
Sugar Creek	Panel 55P
Southpark Creek	Panels 56P-57P
Ford Creek	Panels 58P-59P
Catfish Creek	Panel 60P
Watershed Unit 9	
Spunky Creek Tributary A	Panel 61P
Spunky Creek Tributary B	Panel 62P
Spunky Creek Tributary B-1	Panel 63P
Watershed Unit 10	
Harlow Creek	Panel 64P
Harlow Creek Tributary	Panel 65P
Black Boy Creek	Panel 66P
Watershed Unit 11	
Vensel Creek	Panels 67P-68P
(Shallow Overland Flooding)	
Fred Creek	Panels 69P-70P
Joe Creek	Panel 71P
South Fork Joe Creek	Panel 72P
Little Joe Creek	Panels 73P-74P
South Fork Little Joe Creek	Panel 75P
North Fork Little Joe Creek	Panel 76P
East Branch Joe Creek	Panel 77P
West Branch Joe Creek	Panel 78P
Crow Creek	Panel 79P
Watershed Unit 12	
Hager Creek	Panels 80P-81P
Mooser Creek	Panels 82P-84P
Mooser Creek Tributary	Panel 85P
Cherry Creek (West Tulsa)	Panels 86P-87P
Red Fork Creek	Panel 88P
Nickel Creek	Panel 89P

Watershed Unit 13

Haikey Creek	Panel 90P
West Branch Haikey Creek	Panel 91P
Little Haikey Creek	Panels 92P-94P
Little Haikey Creek Tributary	Panel 95P
Fry Ditch No. 2	Panels 96P-97P

Exhibit 2- Flood Insurance Rate Map Index

Exhibit 3 - Flood Insurance Rate Map

DISTRIBUTED BY THE COMMUNITY:

Flood Boundary and Floodway Map Index
Flood Boundary and Floodway Map

FLOOD INSURANCE STUDY
CITY OF TULSA, OKLAHOMA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Tulsa, Osage and Rogers Counties, Oklahoma, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of the information will be to maintain the City of Tulsa in the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). The City of Tulsa had been converted to the regular program on August 13, 1971. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers, Tulsa District, for the Federal Emergency Management Agency, under Interagency Agreement Number IAA-H-7-76, Project Order No. 22, and IAA-H-10-77, Project Order No. 2, and amendments thereto. Information pertinent to the study was supplied by the Tulsa Metropolitan Area Planning Commission, Tulsa County, the City of Tulsa and other nearby communities, and the local public. This study was completed in September 1979.

1.3 Coordination

All levels of local, state, and Federal Government were contacted in a search for available information. On August 5, 1976, the FEMA conducted the initial coordination meeting for the community study. Attendees included FEMA, Tulsa Metropolitan Area Planning Commission (TMAPC), U.S Army Corps of Engineers, city, and county personnel. The city was informed of the study's intended purposes, and the streams to be studied were selected. Other meetings were conducted during the course of the study to solicit input for the study. An intermediate coordination meeting was held on January 10, 1980, to discuss the preliminary floodways with city officials.

The results of the study were presented to the city officials and local public at the final coordination meeting, held on June 19, 1981.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers those areas lying within the corporate limits of the City of Tulsa, Oklahoma. The study area and corporate limits are shown on the Vicinity Map (Figure 1).

Studies were made on the Arkansas River, Bird Creek, and 16 other major stream systems in the Tulsa area. A total of 58 streams were studied that affect the City of Tulsa. All streams were studied in detail. Table 1 "streams studied", lists those streams studied in this report. The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction through 1981. The scope and methods of study were proposed to and agreed upon by representatives of the FEMA and City of Tulsa. This study was prepared as part of a larger study entitled "Tulsa Metropolitan Area Flood Insurance Study" (FIS) covering Tulsa, twelve (12) other communities, and Tulsa County.

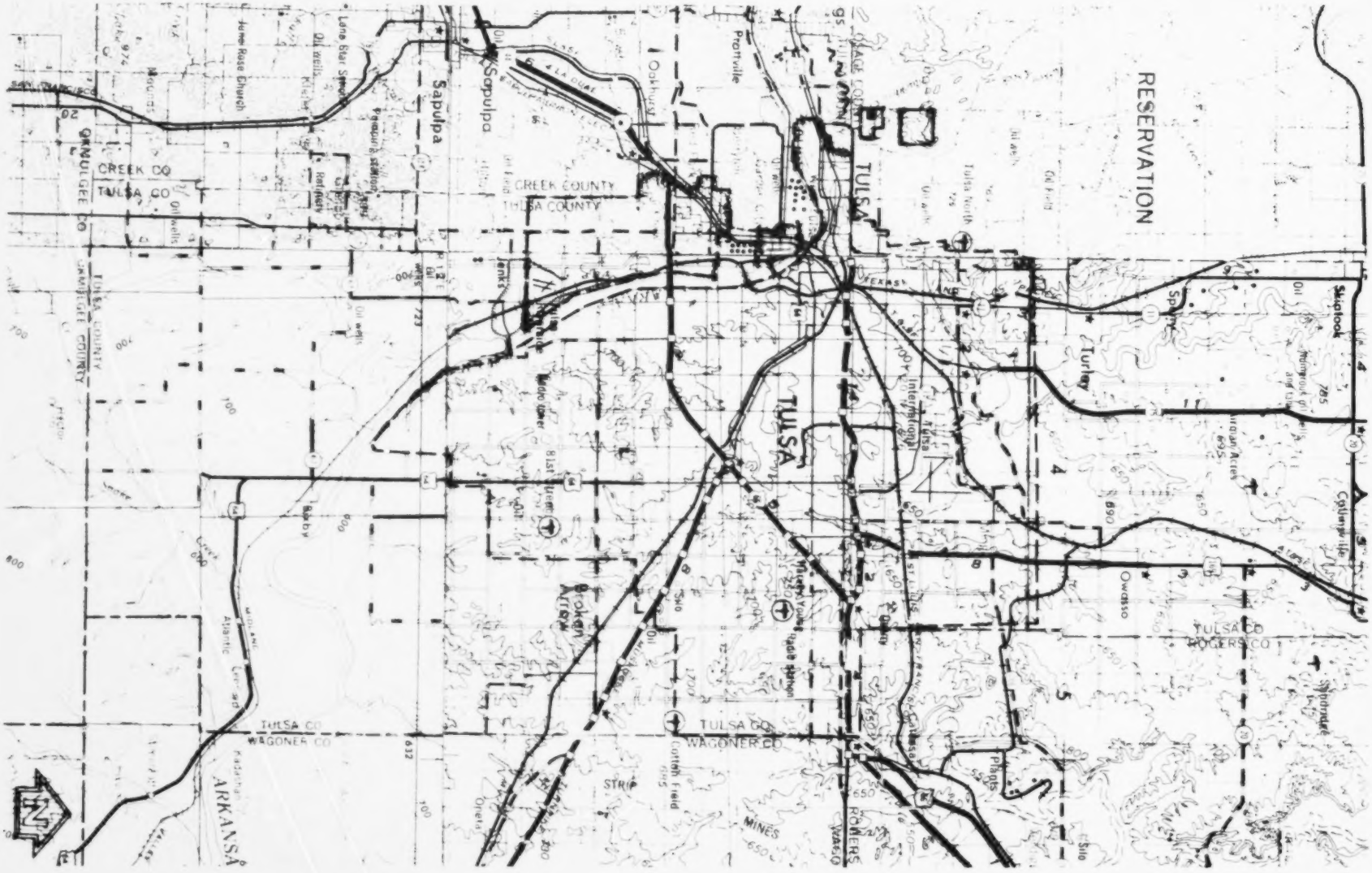

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

APPROXIMATE SCALE

4 2 0 4 8 12 MILES

VICINITY MAP

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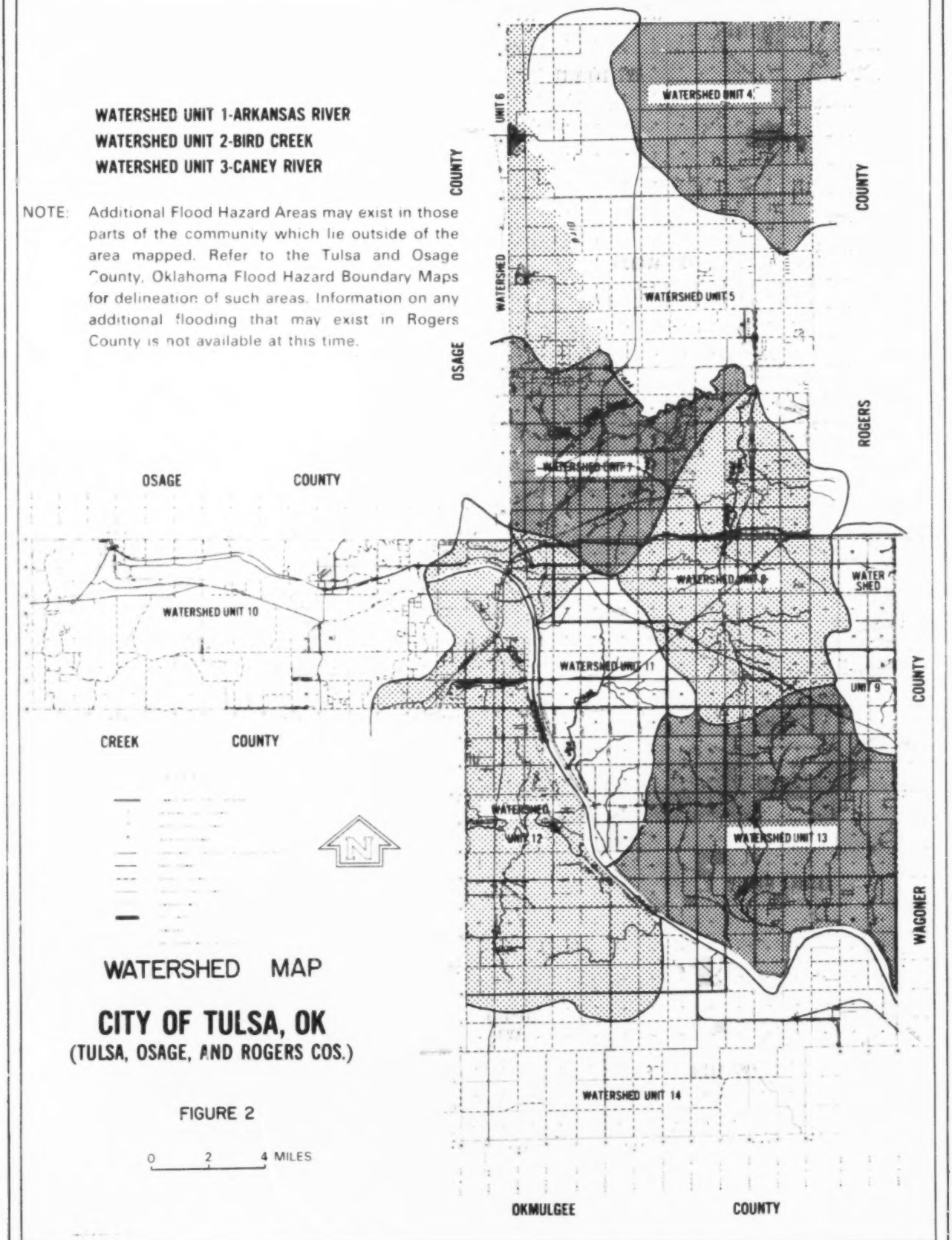
TABLE I
STREAMS STUDIED
CITY OF TULSA, OKLAHOMA

Watershed Unit No.	Name of Stream or River
1	Arkansas River
2	Bird Creek
7	Bird Creek Tributary
	Coal Creek (North Tulsa)
	Coal Creek Tributary
	Flat Rock Creek
	Flat Rock Creek Tributary A
	Dirty Butter Creek
	Dirty Butter Creek Tributary
	Valley View Creek
8	Mingo Creek
	Douglas Creek
	Mill Creek
	Jones Creek
	Audubon Creek
	Bell Creek
	Bell Creek Tributary
	Fulton Creek
	Alsuma Creek
	Little Creek
	Quarry Creek
	Eagle Creek
	Cooley Creek
	Cooley Creek Tributary
	Tupelo Creek
	Tupelo Creek Tributary
	Brookhollow Creek
	Brookhollow Creek Tributary
	Sugar Creek
	Southpark Creek
	Ford Creek
	Catfish Creek
9	Spunky Creek Tributary A
	Spunky Creek Tributary B
	Spunky Creek Tributary B-1

10	Harlow Creek
	Harlow Creek Tributary
11	Vensel Creek
	Fred Creek
	Joe Creek
	South Fork Joe Creek
	Little Joe Creek
	South Fork Little Joe Creek
	North Fork Little Joe Creek
	East Branch Joe Creek
	West Branch Joe Creek
	Crow Creek
12	Hager Creek
	Mooser Creek
	Mooser Creek Tributary
	Cherry Creek (West Tulsa)
	Red Fork Creek
	Nickel Creek
13	Haikey Creek
	West Branch Haikey Creek
	Little Haikey Creek
	Little Haikey Creek Tributary
	Fry Ditch No. 2

The study procedure described below was used to facilitate the management, filing and retrieval of the large amount of data produced during the study. This procedure will also insure compatibility of data provided to adjoining communities (or Tulsa County) and will simplify future alterations due to changes in city boundaries.

Topographic maps with 2-foot contour intervals were prepared for the Tulsa metropolitan area. The maps were prepared on a scale of 1" = 200' and then reduced to 1" = 600' for the FIS work maps (Reference 1). Hydrologic and hydraulic data were developed for individual watersheds. The watersheds were defined as shown in Figure 2 to facilitate the development of hydrologic and hydraulic data using a systematic approach. Each work map panel used for the City of Tulsa includes data developed for each stream on that panel. The Floodway Data Table, Flood Insurance Zone Table, and profiles were developed for the total length of the stream studied. The portion of the above affecting Tulsa was extracted and included in this report. Since the tables included in this report related only to the City of Tulsa, the first letter designation for a cross section for any particular stream may or may not begin with the letter "A".


WATERSHED UNIT 1-ARKANSAS RIVER
WATERSHED UNIT 2-BIRD CREEK
WATERSHED UNIT 3-CANEY RIVER
NOTE: Additional Flood Hazard Areas may exist in those parts of the community which lie outside of the area mapped. Refer to the Tulsa and Osage County, Oklahoma Flood Hazard Boundary Maps for delineation of such areas. Information on any additional flooding that may exist in Rogers County is not available at this time.
WATERSHED UNIT 4
WATERSHED UNIT 5
WATERSHED UNIT 6
WATERSHED UNIT 7
WATERSHED UNIT 8
WATERSHED UNIT 9
WATERSHED UNIT 10
WATERSHED UNIT 11
WATERSHED UNIT 12
WATERSHED UNIT 13
WATERSHED UNIT 14
OSAGE COUNTY
ROGERS COUNTY
WAGONER COUNTY
CREEK COUNTY
OKMULGEE COUNTY
N
WATERSHED MAP
CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)
FIGURE 2
0 2 4 MILES

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA, the City of Tulsa, and the Corps of Engineers.

2.2 Community Description

Tulsa, Oklahoma's second largest city, is located in Tulsa, Osage, and Rogers Counties, in northeast Oklahoma. Tulsa lies about 90 miles northeast of Oklahoma City. Nearby communities include Broken Arrow, Sand Springs, and Bixby, Oklahoma. The 1978 population of Tulsa was estimated at about 357,000.

The general area of this study was orginally part of Indian Territory which was composed of the territories west of the Mississippi and included in the Louisiana Purchase. The first settlers to arrive in the study area were the Creek Indians who were relocated from their land allocations in the southern states by directives from Congress in the early part of the nineteenth century.

Land runs were opened in 1889, 1891, and 1893 which attracted large numbers of settlers. In 1897, oil was discovered at Bartlesville, 60 miles north of Tulsa and the whole nature of the region changed with the influx of speculators, drillers, and wildcatters. Oil was discovered in west Tulsa in 1901 which attracted investors from the East, and Tulsa became the main center of oil concern. The Glenn Pool discovery, located about 15 miles southwest of Tulsa, came in 1905 and is still considered by geologists to be the richest small oil field in the world. After two years of development, there were 500 wells furnishing the oil that our developing economy needed. It was at that time Tulsa was named the "Oil Capital of the World". The three major facets of the industrial base are manufacturing, petroleum, and aerospace, but the Arkansas River Basin Navigation System has opened up new possibilities for industrial growth.

The terrain in the Tulsa area is mostly gently rolling hills, with a small amount of flat land located in the Arkansas River flood plain. Vegetation includes native prairie grasses (big and little bluestem, switch grass, and side-oats grama) and introduced species such as Bermuda grass and Fescue. Trees of the area include juniper, cedar, spruce, elm, blackjack, and varieties of oak.

Weather is generally temperate in Tulsa with mild winters and occasional snow. The average annual precipitation is about 37 inches. The average annual temperature is 61 degrees F with a mean high of 82 degrees F and a mean low of 38 degrees F.

Tulsa's drainage pattern is dominated by the Arkansas River and its tributaries, and Bird Creek and its tributaries. Watershed Units 10, 11, and 13 drain south into the Arkansas River, and Unit 12 drains east to the river; watershed units 7 and 8 drain east and north, respectively, into Bird Creek.

The major pattern of development is to the southeast. Large areas of Tulsa lie within the existing 100-year flood plain, with the largest flood plain development located in the Mingo Creek watershed (Watershed Unit 8).

2.3 Principal Flood Problems

Several floods have occurred in the Tulsa area. Major flooding of the Arkansas River occurred in 1908, 1923, 1957, and 1959. A water stage recorder gage is located on the river at the 11th Street Bridge. The flood peak of record at the gage occurred on October 5, 1959, with a peak flow estimated at 246,000 cubic feet per second (cfs). The recurrence interval of that flood at the gage (for non-regulated conditions) is about once in every 25 years.

Numerous floods have occurred in the Bird Creek basin. The flood of October 3, 1959, is the largest flood of record at the Sperry gage (8th Street North) with a peak discharge of 90,000 cfs which is estimated to be the 100-year event under natural conditions. Severe floods also occurred in 1943 and twice in 1974. Various amounts of overbank flooding has occurred about every 6 to 7 years on the average.

Floods have also occurred on the other streams studied. The two most severe floods on Haikey Creek and its tributaries occurred on June 8, 1974, and May 30, 1976. The June 1974 flood was the most severe on the lower end of the watershed. A flood equivalent in size to the May 30, 1976 flood on Haikey Creek would occur, on the average, every 10-20 years.

The Mingo Creek watershed experienced severe flooding in June 1974 and May 1976 also. The May 30, 1976 flood was the flood of record for Mingo Creek. That flood has been estimated to have two recurrence intervals; from 10 years in the lower basin, to 100 years in the upper areas.

Major flooding has also occurred along Joe, Flat Rock, Dirty, Butter and Cherry Creeks. The June 8, 1974 and May 30, 1976 floods were the two most severe on Joe Creek, while the June 22, 1979, flood was the most severe on Dirty Butter Creek. The flood of record for Flat Rock Creek occurred on July 15, 1961. The May 30, 1976 flood on Joe Creek was estimated to be about a 50-year event at the lower end of the creek.

The majority of severe flooding in the Tulsa area is caused by intense rainfall resulting from local thunderstorms. The amount of flooding is generally increased in the areas where natural and manmade obstructions in the flood plain impede large flows.

Manmade obstructions include bridges, culverts, earthfills, and building developments. Natural obstructions include dense vegetation, constrictions in the flood plain topography, and meandering channels.

Photographs of historic flood scenes in the Tulsa area are shown on Figures 3 through 10.

2.4 Flood Protection Measures

Major flood control projects on the Arkansas River above Tulsa include Keystone and Kaw Lakes and John Martin Reservoir. Several small dams are located on tributaries of the Arkansas River, but Keystone and Kaw Lakes are the only projects considered to have significant effects on the Arkansas River flows at Tulsa. Keystone Lake was completed in September 1964, and Kaw Lake was completed in April 1976. The Keystone and Kaw Lake projects reduce the natural 100-year flood on the Arkansas River from 360,000 cfs to about 170,000 cfs at the gage located on the 11th Street Bridge.

Local flood protection projects have been built on Flat Rock, Valley View, Mingo, Cherry, and Red Fork Creeks. The Flat Rock Creek project (built by the Corps of Engineers) consists of about 1.2 miles of channel modification on Flat Rock Creek from Peoria Avenue to Cincinnati Avenue. Also about 0.8 mile of channel on Valley View Creek was modified. The Flat Rock Creek project provides about 50-year protection.

Several portions of the Mingo Creek channel have been straightened and widened to reduce flooding along the creek. The modifications were made by land developers and by the city. The modifications provide up to about a 50-year level of protection for various areas.

The Cherry Creek local flood protection project, constructed by the Corps of Engineers in November 1969, consists of 5,300 feet of channel modification along Cherry Creek, and about 1,300 feet of channel modification along Red Fork Creek. Frequency studies indicate that the project will provide about 10-50 year protection, depending on the location along the creek.

Joe Creek has been channelized and straightened from its confluence with the Arkansas River to about East 66th Street. The channel modification was done by local land developers, and will contain about a 100-year flood flow. Additional channelization is being done by the Corps of Engineers along Joe Creek from East 66th Street upstream to 51st Street. The modified channel will carry the 100-year flood flow.

FIGURE 3: View looking south at Arkansas River near Frisco and 11th Street bridges during flood of June 13, 1923.

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FIGURE 4: View looking west across Arkansas River near Old Midland Valley Railroad bridge during flood of October 5, 1959.

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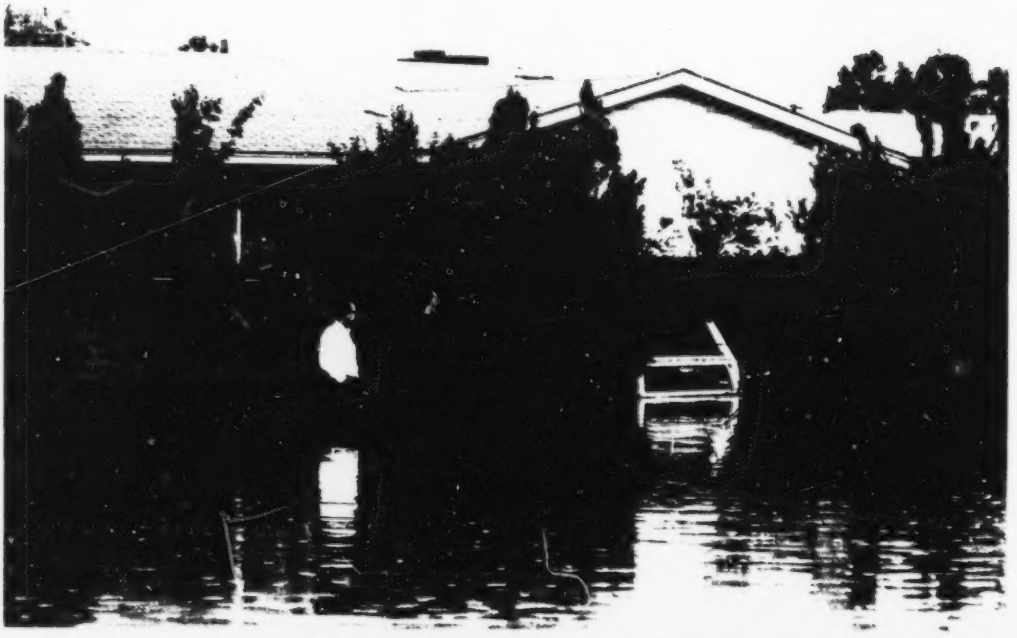

FIGURE 5: View of flood waters near 9500 block of East 8th Street along Mingo Creek during June 1968 flood.

FIGURE 6: View of flood waters along Mingo Creek during June 1968 flood.

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FIGURE 7: View near intersection of 7th Street and Mingo Road during flood of May 30, 1976.

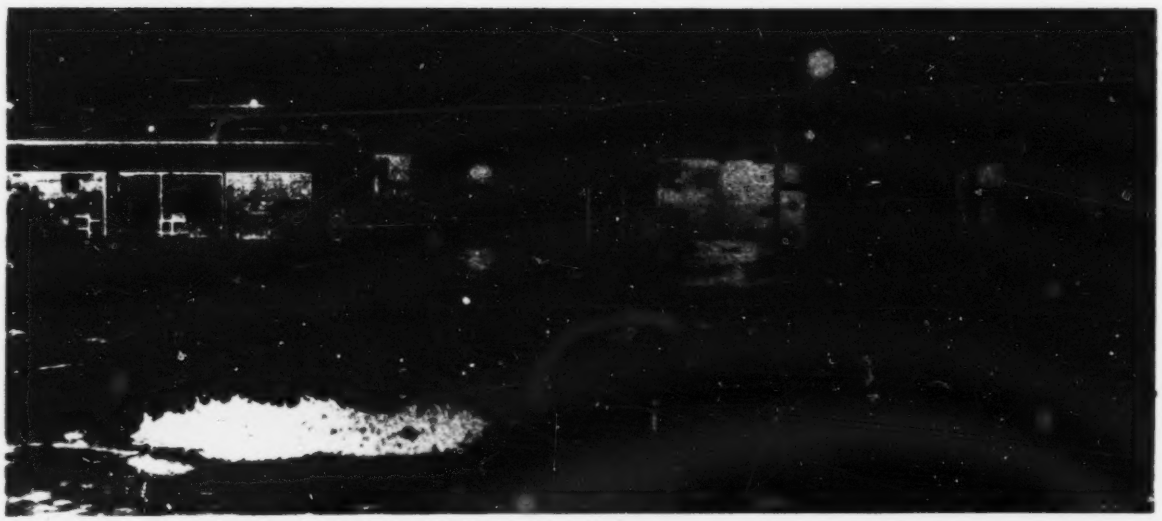

FIGURE 8: View near intersection of 11th Street and Mingo Road during flood of May 30, 1976.

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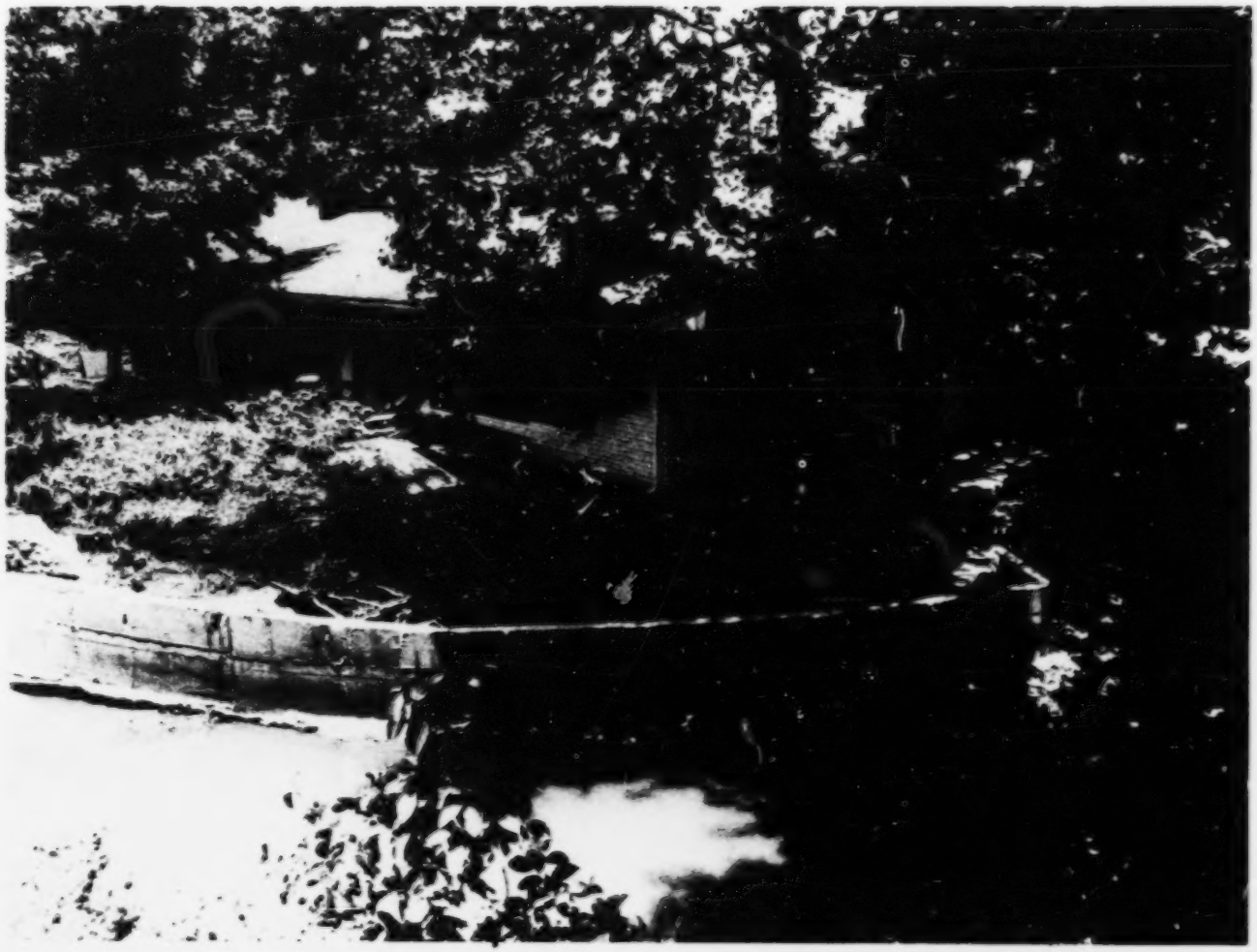

FIGURE 9: Flood waters of May 1976 demolished this house at Sandusky Avenue and Little Joe Creek.

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FIGURE 10: The Flamingo Trailer Park near Pine Street and Mingo Creek was hard hit by floodwaters of May 1976.

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The Bird Creek basin has 3 major flood control projects that affect flows at Tulsa. Those projects are Skiatook, Birch, and Candy Lakes. Birch Lake was completed in March 1977; closure on Skiatook and Candy Lakes are tentatively scheduled for October 1982 and June 1982, respectively, depending on congressional funding and contract scheduling. The 3 projects on Bird Creek will reduce the 100-year flood flow at the Sperry gage (located at 86th Street North bridge) from about 90,000 cfs to about 43,000 cfs. The effects of this flow reduction will diminish downstream because of the intervening uncontrolled area.

In addition to the above structural measures, several small agricultural levees are located in the study area. These levees were assumed to remain in place during flooding conditions. Tulsa also employs various nonstructural measures to reduce flood damages and prevent future losses such as the use of flood zoning ordinances, subdivision regulations, building permits, and flash flood warnings.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Natural floodflow frequencies for the Arkansas River were based on a statistical analysis of peak flows at the Tulsa gage (located on the 11th Street bridge) for the period October 1904 through September 1964. Keystone Lake inflows were used from September 1964 through September 1975. Methods outlined in a U.S. Water Resources Council Bulletin (Reference 2), were used in developing the natural frequency curve without regulation by Kaw and Keystone. Hypothetical flows were developed for regulated conditions for the period 1940 to 1976 using a reservoir system simulation model. These flows were used to derive a frequency curve for modified conditons showing the effects of Kaw and Keystone.

Natural floodflow frequencies for Bird Creek at Sperry were based on a statistical analysis of peak flows at the Sperry gage for the period 1939 through 1976. The modified flows used in the study were then developed by modeling design storms with and without regulation for the Sperry gaging station and downstream locations. For floodflows on the other streams studied in detail, the drainage areas were appropriately subdivided and synthetic unit hydrographs were determined for each subarea using Snyder's method. The unit hydrograph coefficients were adjusted for urbanization. Rainfall data for the selected floods were obtained from the U.S. Weather Bureau Technical Paper No. 40 (TP-40) (Reference 3), and the estimated rainfall excesses were applied to the unit graphs to obtain the runoffs.

TP-40 rainfall was adjusted to make the resulting frequency curve consistent with the curves developed in a regional frequency study. Runoffs from the individual subareas were then routed by the storage-discharge method and combined to determine peak flows at points along the stream.

The unit hydrographs used were adjusted to reflect the effects of development presently existing in the watershed.

The peak discharge-drainage area relationships for the selected recurrence intervals are presented in Table 2, "Summary of Discharges."

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ARKANSAS RIVER[1]					
Lower Limit of Study	23,090[2]	90,000	105,000	170,000	480,000
At Keystone Lake	22,350[2]	90,000	105,000	170,000	480,000
BIRD CREEK					
Lower Limit of Study[3]	1,125	25,000	43,500	52,500	77,000
Sperry Oklahoma[3]	905	21,000	35,500	43,000	62,500
COAL CREEK					
At mouth	9.5	2,940	5,610	7,100	11,100
FLAT ROCK CREEK					
At mouth	35.5	8,900	18,700	23,800	37,300
N. Peoria Avenue	11.7	6,420	12,500	15,200	23,900
DIRTY BUTTER CREEK					
At mouth	8.6	5,090	8,790	10,800	17,000
MINGO CREEK					
At mouth	61.1	15,550	30,200	34,900	56,050
11th Street Bridge	25.6	9,600	18,100	22,300	33,450
SPUNKY CREEK					
Lower Limits of Study	3.8	2,060	3,560	4,160	7,180
HARLOW CREEK					
At mouth	6.9	2,930	5,670	6,000	6,000[4]
Tulsa-Osage County Line	4.0	1,940	3,690	4,600	7,090
VENSEL CREEK					
At mouth	4.7	1,650	2,280	2,560	2,710
FRED CREEK					
At mouth	3.7	2,660	4,850	5,620	7,320

(1) Modified by Keystone, Kaw, Great Salt Plains, and Cheney Resevoirs.

(2) Drainage area contributing to peak. Total drainage area is 74,506 square miles.

(3) Peak discharges reflect conditions modified by Birch, Candy and Skiatook Lakes.

(4) Discharge in excess of 6000 cfs is lost from basin.

TABLE 2 - SUMMARY OF DISCHARGES-continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
JOE CREEK					
At mouth	13.1	6,100	11,500	14,000	21,500
Confluence of South Fork Joe Creek	10.8	5,340	10,030	12,215	18,800
LITTLE JOE CREEK					
At mouth	4.3	3,532	6,175	7,352	10,847
CROW CREEK					
At mouth	2.6	2,090	3,730	4,520	6,830
HAGER CREEK					
At mouth	2.6	750	1,170	1,420	2,240
MOOSER CREEK					
At mouth	5.1	2,690	5,190	6,390	10,100
CHERRY CREEK					
At mouth	6.2	3,000	5,300	6,000	7,800
Above confluence of Red Fork Creek	2.7	800	1,300	1,600	2,200
RED FORK CREEK					
At mouth	2.9	2,100	3,600	4,500	6,900
NICKEL CREEK					
At mouth	13.3	3,300	6,500	8,300	13,400
WEST BRANCH HAIKEY CREEK					
At mouth	1.6	1,700	3,300	4,100	6,300
LITTLE HAIKEY CREEK					
At mouth	6.4	2,200	5,200	6,600	11,300
E. 91st Street	3.4	2,200	4,400	5,500	9,400
FRY DITCH NO. 2					
Cross section BI	5.2	3,610	4,830	5,430	6,650

3.2 Hydraulic Analyses

Analyses of the hydraulic features of the streams in the study area were performed to provide estimates of the elevations for floods of the selected recurrence intervals along each stream studied in detail.

Cross sections of each of the stream channels and valleys studied in detail were obtained by field surveys and aerial photogrammetry. These sections were supplemented by data taken from topographic maps with a scale of 1:2400 and with contour intervals of 2 feet and supplemental 1 foot contours (Reference 1). Bridge and road plans (Reference 4) were used for some of the cross sections; while, other bridge cross sections and bridge geometry were field measured. The locations of the cross sections are shown on the Flood Boundary and Floodway Work Maps.

Roughness coefficients (Manning's "n") were based on field reconnaissance and typical photographs of the area. The various roughness coefficients used for the detailed studies are listed in the following tabulation. High water marks for recent floods were used to verify "n" values for some of the streams.

ROUGHNESS COEFFICIENTS
(Manning's "n")

Flooding Source	Channels	Overbanks
Arkansas River	.025-.033	.040-.150
Bird Creek	.045-.070	.030-.110
Flat Rock Creek and tributaries	.035-.080	.040-.200
Dirty Butter Creek and tributaries	.040-.100	.035-.180
Coal Creek	.020-.080	.040-.080
Mingo Creek and tributaries	.015-.150	.040-.150
Spunky Creek tributaries	.040-.060	.040-.100
Harlow Creek	.040	.040-.060
Joe Creek and tributaries	.013-.250	.035-.250
Fred Creek	.040-.080	.050-.150
Vensel Creek	.030-.065	.017-.050
Hager Creek	.045-.100	.050-.100
Mooser Creek	.060-.070	.060-.150
Cherry Creek	.045-.060	.060-.120
Nickel Creek	.070	.080-.120
Little Haikey Creek	.020-.125	.035-.090
Fry Ditch No. 2	.030-.070	.040-.080

Water-surface elevations were computed using the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 5). Starting water-surface elevations on tributaries to the Arkansas River and Bird Creek were determined by the normal depth method. If the backwater from the Arkansas River or Bird Creek was higher, it was considered the controlling elevation. Starting water-surface elevations for the remaining streams were based on coincident flooding occurring on the streams into which the tributaries flow. Flood profiles of the 10-, 50-, 100-, and 500-year flood water-surface elevations were drawn to an accuracy of ±0.5 foot (Exhibit 1).

The upper end of Cherry Creek was studied by the approximate method. The 100-year flood boundary was delineated by using the 2-foot contour topographic maps and the best information available. Profiles were not prepared for this portion of the stream.

All elevations appearing in this report are measured from 1929 NGVD. Elevation reference marks in the study area are shown on the Flood Insurance Rate Maps (published separately).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2400 with a contour interval of 2 feet (Reference 1). In cases where the 100- and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Insurance Rate Maps. (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain when possible. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3). The resulting floodways were coordinated with the city officials.

As shown on the Flood Boundary and Floodway Maps , the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 11.

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 1 Arkansas River								
Z*	73,181	1717	26,596	6.4	605.8	605.8	605.9	0.1
AA	79,200	2497/300[2]	34,889	4.9	608.3	608.3	608.5	0.2
AB	82,368	2073/50[2]	36,908	4.6	609.1	609.1	609.2	0.1
AC	86,592	1770/80[2]	25,034	6.8	610.3	610.3	610.4	0.1
AD	89,760	1920/100[2]	29,976	5.7	611.9	611.9	611.9	0.0
AE*	92,928	2320	31,376	5.4	613.0	613.0	613.0	0.0
AF*	98,102	1400	28,343	6.2	615.0	615.0	615.0	0.0
AG	103,858	1820	34,038	5.4	617.3	617.3	617.3	0.0
AH	107,395	2330	40,787	4.3	618.3	618.3	618.3	0.0
AI	111,936	1980	28,169	6.0	619.2	619.2	619.2	0.0
AJ	116,688	1300	24,287	7.0	621.1	621.1	621.1	0.0
AK	124,872	2120	31,277	5.4	625.7	625.7	625.7	0.0
AL	130,416	1520	27,263	6.4	627.3	627.3	627.3	0.0
AM	134,482	1760/1660[2]	36,293	4.7	628.9	628.9	628.9	0.0
AN	136,013	1370	21,004	8.1	629.2	629.2	629.2	0.0
AO	141,768	1250	19,005	8.9	632.2	632.2	632.2	0.0
AP	145,886	1310	22,450	7.6	634.5	634.5	634.5	0.0
AQ*	151,114	1130	26,690	6.5	636.9	636.9	636.9	0.0
AR*	157,450	2050	27,544	6.3	639.6	639.6	639.6	0.0

[1]Feet above River Mile 496.2
[2]Total width/width within corporate limits
*Outside corporate limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

ARKANSAS RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Watershed Unit No. 2 Bird Creek								
A	47,330	2570	20,186	2.6	583.5	583.5	584.5	1.0
B	50,160	763	11,893	4.4	584.8	584.8	585.7	0.9
C*	54,827	1307	19,510	2.8	586.5	586.5	587.5	1.0
D*	58,080	2299	27,903	1.9	587.6	587.6	588.5	0.9
E*	62,251	2949	29,476	1.5	588.6	588.6	589.5	0.9
F*	64,078	4838	25,403	1.9	589.2	589.2	590.1	0.9
G*	68,640	3292	29,927	1.4	590.0	590.0	590.9	0.9
H*	70,039	3396	15,031	2.8	590.4	590.4	591.3	0.9
I*	73,255	4720	52,592	0.8	590.9	590.9	591.9	1.0
J	80,098	9481/1450[2]	80,217	0.6	591.0	591.0	592.0	1.0
K	87,278	9977/4980[2]	72,905	0.7	591.5	591.5	592.5	1.0
L	92,030	9700/6460[2]	72,689	0.7	591.7	591.7	592.7	1.0
M	97,680	8408/6800[2]	38,214	1.4	592.9	592.9	593.9	1.0
N	101,429	5413/5210[2]	30,528	1.8	597.0	597.0	597.9	0.9
O	105,178	4826/3960[2]	32,512	1.7	598.5	598.5	599.4	0.9
P*	106,693	4250	26,410	1.9	599.6	599.6	600.6	1.0
Q*	109,296	2448	12,459	4.0	601.1	601.1	602.1	1.0
R*	111,656	2781	25,865	1.9	603.7	603.7	604.7	1.0
S*	114,032	2501	14,917	3.3	605.9	605.9	606.7	0.8

[1]Feet above Verdigris River.
[2]Total width/width within corporate limits.
*Outside corporate limits.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

BIRD CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 7 Bird Creek Tributary								
A	1,300	176	683	2.1	594.5	592.8[2]	593.8[2]	1.0
B	2,900	150	323	4.4	600.6	600.6	601.4	0.8
C	4,150	175	702	2.0	603.5	603.5	604.4	0.9
D	5,230	111	370	3.8	606.5	606.5	606.9	0.4
E	6,050	100	384	3.7	609.7	609.7	610.5	0.8
Coal Creek (North Tulsa)								
A	2,860	1500	3,400	2.1	594.2	593.0[2]	594.0[2]	1.0
B	4,085	1504	4,055	1.8	594.2	593.6[2]	594.5[2]	0.9
C	7,075	1000	3,296	2.2	595.1	595.1	595.8	0.7
D	8,975	600	1,735	4.0	597.6	597.6	598.5	0.9
E	9,472	200	1,010	6.9	599.7	599.7	600.0	0.3
F	9,717	200	2,046	3.4	602.7	602.7	603.4	0.7
G	10,352	200	1,528	4.6	603.4	603.4	604.3	0.9
H	11,072	210	1,337	5.2	605.2	605.2	605.7	0.5
I	12,122	275	2,100	3.2	607.2	607.2	607.8	0.6
J	12,697	300	1,831	3.7	608.0	608.0	609.0	1.0
K	13,307	200	1,152	5.8	610.5	610.5	611.1	0.6

[1]Feet above Mohawk Park Pond for Bird Creek Tributary; Feet above mouth for Coal Creek (North Tulsa)
[2]Water-surface elevation computed without consideration of backwater effects

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

BIRD CREEK TRIBUTARY - COAL CREEK (NORTH TULSA)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Watershed Unit 7 Coal Creek (North Tulsa) cont.								
L	14,117	150	1,098	6.1	613.5	613.5	613.9	0.4
M	14,952	125	1,343	5.0	616.1	616.1	616.5	0.4
N	15,777	168	1,178	5.7	618.1	618.1	618.5	0.4
O	16,679	212	2,070	3.3	621.4	621.4	621.9	0.5
P	17,319	295	1,738	3.9	622.1	622.1	622.6	0.5
Q	19,224	150	1,125	5.5	626.2	626.2	627.0	0.8
R	20,124	315	1,965	3.1	628.9	628.9	629.7	0.8
S	20,804	90	667	7.5	629.6	629.6	630.3	0.7
T	21,454	150	637	7.8	634.6	634.6	635.3	0.7
U	22,104	83	643	7.8	638.1	638.1	638.6	0.5
V	23,197	173	1,097	4.6	643.1	643.1	643.9	0.8
W	24,251	105	711	7.0	649.9	649.9	650.0	0.1
X	24,409	100	918	5.4	652.4	652.4	652.4	0.0
Y	25,884	105	1,009	5.0	655.6	655.6	656.0	0.4
Z	26,167	79	719	7.0	656.5	656.5	657.1	0.6
AA	27,417	104	937	5.3	661.0	661.0	661.5	0.5
AB	27,601	50	544	9.2	661.8	661.8	662.3	0.5
AC	28,781	92	517	9.6	663.7	663.7	663.9	0.2
AD	30,156	57	228	11.5	671.0	671.0	671.0	0.0
AE	31,846	23	120	13.0	684.3	684.3	684.3	0.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

COAL CREEK(NORTH TULSA)

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 7 Coal Creek Tributary								
A	640	52	287	8.5	665.4	665.4	666.4	1.0
B	1,080	46	304	8.0	669.9	669.9	670.0	0.1
C	1,375	95	462	2.9	673.4	673.4	673.9	0.5
D	1,825	58	307	4.4	676.0	676.0	676.0	0.0
E	2,475	31	184	7.3	680.4	680.4	680.8	0.4
Flat Rock Creek								
A	3,000	1500	5,560	4.3	598.7	598.7	599.7	1.0
B	3,950	1415	10,720	2.2	599.7	599.7	600.7	1.0
C	4,900	1125	7,234	3.3	600.1	600.1	601.1	1.0
D	6,225	500	5,401	4.4	601.0	601.0	602.0	1.0
E	7,110	300	3,227	7.0	604.3	604.3	604.3	0.0
F	8,660	885	7,905	3.0	606.4	606.4	607.4	1.0
G	9,735	874	7,337	3.2	607.0	607.0	607.9	0.9

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

COAL CREEK TRIBUTARY-FLAT ROCK CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit 7 Flat Rock Creek (continued)								
H	11,635	1049	7,520	3.2	607.8	607.8	608.7	0.9
I	13,685	937	5,842	4.1	609.0	609.0	609.9	0.9
J	16,085	1062	7,290	3.3	610.6	610.6	611.5	0.9
K	17,911	900	5,851	4.1	611.8	611.8	612.6	0.8
L	19,386	1395	9,454	2.7	613.0	613.0	614.0	1.0
M	21,211	999	5,538	2.8	613.9	613.9	614.9	1.0
N	23,111	999	6,071	2.5	615.3	615.3	616.2	0.9
O	25,611	750	3,223	4.7	617.3	617.3	618.2	0.9
P	27,015	250	2,470	6.2	620.4	620.4	521.2	0.8
Q	27,767	167	1,920	7.9	621.9	621.9	622.2	0.3
R	28,867	152	1,657	7.4	623.0	623.0	623.6	0.6
S	29,792	175	1,571	7.4	626.4	626.4	626.5	0.1
T	31,367	173	1,345	8.6	629.4	629.4	629.5	0.1
U	32,367	154	1,401	8.3	631.8	631.8	631.8	0.0
V	33,707	202	1,470	7.8	638.7	638.7	638.7	0.0
W*	34,832	175	1,829	6.2	644.6	644.6	644.9	0.3
X*	36,132	200	1,950	5.8	647.0	647.0	647.2	0.2

[1]Feet above mouth

*Outside corporate limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FLAT ROCK CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ FT)	MEAN VELOCITY (F P S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 7 Flat Rock Creek Tributary A								
A	825	58	567	4.9	601.9	592.6[2]	593.6[2]	1.0
B	1,975	62	602	4.6	602.2	595.2[2]	595.7[2]	0.5
C	3,625	80	917	3.0	602.8	597.4[2]	597.7[2]	0.3
D	4,926	155	853	3.2	607.8	606.8[2]	606.8[2]	0.0
E	6,076	63	440	6.2	608.4	608.4	609.3	0.9
F	7,101	54	277	9.9	616.7	616.7	616.7	0.0
Dirty Butter Creek								
A	3,625	362	2,603	4.1	614.9	613.5[2]	614.5[2]	1.0
B	5,895	520	3,500	3.1	617.8	617.8	618.8	1.0
C	7,612	520	3,238	3.3	621.7	621.7	621.9	0.2
D	8,612	460	2,442	4.5	622.8	622.8	623.3	0.5
E	10,150	371	3,510	3.1	626.0	626.0	626.8	0.8
F	11,720	209	1,014	7.7	631.8	631.8	631.9	0.1
G	12,514	320	2,056	3.8	635.3	635.3	635.9	0.6
H	13,114	570	3,276	2.4	635.9	635.9	636.6	0.7
I	13,841	347	1,267	4.9	636.2	636.2	637.2	1.0
J	15,466	205	1,185	5.3	641.7	641.7	642.6	0.9

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of coincident flooding effects

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FLAT ROCK CREEK TRIBUTARY A-DIRTY BUTTER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 7 Dirty Butter Creek (continued)								
K	16,766	212	1,240	5.0	647.4	647.4	648.0	0.6
L	17,466	250	1,906	3.3	648.3	648.3	649.0	0.7
M	18,790	79	1,012	6.2	655.6	655.6	655.6	0.0
N	19,115	79	1,039	5.3	655.7	655.7	655.7	0.0
Dirty Butter Creek Tributary								
A	775	94	565	6.5	629.3	629.3	630.3	1.0
B	1,409	50	834	4.4	641.4	641.4	641.4	0.0
C	2,684	86	879	4.5	641.5	641.5	642.1	0.6
D	3,684	71	638	6.1	644.8	644.8	645.0	0.2
E	4,229	94	612	6.4	646.2	646.2	646.7	0.5
F	5,254	160	588	6.7	650.3	650.3	650.8	0.5

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

DIRTY BUTTER CREEK-DIRTY BUTTER CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 7 Valley View Creek								
A	425	81	592	6.3	622.0	622.0	622.7	0.7
B	1,400	73	424	8.8	622.4	622.4	622.5	0.1
C	2,671	115	742	5.0	627.5	627.5	627.5	0.0
D	3,742	63	407	9.2	631.2	631.2	631.2	0.0
E	4,499	56	584	6.4	641.0	641.0	641.4	0.4
F	5,101	48	531	7.0	645.4	645.4	645.4	0.0
G	5,826	48	399	8.7	645.6	645.6	645.6	0.0
H	6,560	39	204	12.6	645.9	645.9	645.9	0.0
I	7,861	35	193	13.4	657.0	657.0	657.0	0.0
J	8,151	38	198	13.0	658.5	658.5	658.5	0.0
K	8,868	38	198	13.0	664.4	664.4	664.4	0.0
L	9,143	38	198	13.0	666.4	666.4	666.4	0.0
Watershed Unit No. 8 Mingo Creek								
A	2,000	980	1,170	3.0	590.3	590.3	591.3	1.0
B	2,200	1750	25,120	1.4	591.5	591.5	592.5	1.0
C	3,290	1460	19,180	1.8	591.6	591.6	592.6	1.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

VALLEY VIEW CREEK-MINGO CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Mingo Creek (continued)								
D	5,590	2260	24,250	1.4	592.2	592.2	593.2	1.0
E	9,100	2110	24,510	1.4	592.8	592.8	593.8	1.0
F	10,710	1300	13,920	2.5	593.8	593.8	594.8	1.0
G	10,910	1390	16,690	2.1	595.6	595.6	596.2	0.6
H	12,650	540	6,560	5.3	597.0	597.0	597.6	0.6
I	13,790	540	9,210	3.8	600.0	600.0	600.9	0.9
J	15,430	490	7,620	4.5	603.1	603.1	604.1	1.0
K	16,850	410	7,840	4.4	606.7	606.7	607.7	1.0
L	18,370	1350	11,640	3.0	612.4	612.4	613.3	0.9
M	21,320	2510	43,020	0.8	612.8	612.8	613.7	0.9
N	25,590	3150	46,850	0.7	612.9	612.9	613.8	0.9
O	28,220	2440	37,150	0.9	613.0	613.0	614.0	1.0
P	30,050	2880	43,410	0.8	613.1	613.1	614.1	1.0
Q	31,390	2920	35,230	0.9	613.2	613.2	614.2	1.0
R	32,840	2410	23,100	1.3	613.4	613.4	614.4	1.0
S	34,280	320	6,320	5.0	613.8	613.8	614.7	0.9
T	35,370	430	6,150	5.3	614.2	614.2	615.1	0.9
U	36,900	280	5,080	6.4	614.9	614.9	615.7	0.8
V	38,680	330	5,030	6.4	616.0	616.0	616.7	0.7

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

MINGO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Mingo Creek (continued)								
W	39,130	270	4,010	8.1	617.7	617.7	617.9	0.2
X	40,270	240	3,760	7.4	618.8	618.8	619.1	0.3
Y	40,440	310	4,710	5.9	619.7	619.7	619.7	0.0
Z	42,860	270	4,040	6.9	621.1	621.1	621.3	0.2
AA	44,390	260	4,100	5.9	622.3	622.3	622.5	0.2
AB	45,560	220	2,920	7.6	622.8	622.8	623.1	0.3
AC	47,180	1590	9,560	2.3	631.5	631.5	632.4	0.9
AD	50,710	1420	12,120	2.0	635.8	635.8	636.8	1.0
AE	53,090	1520	14,250	1.7	638.2	638.2	639.2	1.0
AF	54,650	1230	8,510	2.9	640.6	640.6	641.6	1.0
AG	57,120	1200	10,780	2.3	642.9	642.9	643.8	0.9
AH	59,320	200	2,980	7.4	643.3	643.3	644.2	0.9
AI	59,850	190	2,770	5.8	644.1	644.1	645.1	1.0
AJ	60,000	350	2,960	5.4	644.6	644.6	645.4	0.8
AK	61,110	210	3,050	5.3	645.3	645.3	646.3	1.0
AL	63,240	180	2,360	5.2	647.6	647.6	648.5	0.9
AM	64,370	180	2,250	5.4	648.5	648.5	649.3	0.8
AN	65,770	160	1,850	5.2	650.3	650.3	650.9	0.6
AO	66,550	160	1,960	4.9	652.3	652.3	652.9	0.6

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

MINGO CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE'	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Mingo Creek (continued)								
AP	67,370	110	1,090	7.6	653.5	653.5	653.9	0.4
AQ	68,130	120	1,090	7.6	655.4	655.4	655.6	0.2
AR	69,970	170	1,710	4.2	660.1	660.1	660.6	0.5
AS	70,930	110	980	5.3	660.7	660.7	661.2	0.5
AT	72,280	140	1,340	3.8	662.1	662.1	662.5	0.4
AU	72,640	100	980	5.2	663.6	663.6	663.9	0.3
AV	74,170	80	480	6.4	668.4	668.4	668.8	0.4
AW	75,060	90	540	5.7	670.1	670.1	670.6	0.5
AX	75,540	50	390	7.8	670.1	670.1	670.6	0.5
AY	76,490	110	740	4.1	673.4	673.4	673.6	0.2
AZ	77,300	100	610	5.0	674.4	674.4	674.5	0.1
BA	78,380	90	440	6.9	676.9	676.9	676.9	0.0
BB	79,200	260	1,010	2.8	683.8	683.8	684.8	1.0
BC	80,970	380	2,820	0.9	690.0	690.0	690.9	0.9
BD	81,630	690	1,050	2.4	691.4	691.4	692.4	1.0
BE	82,500	230	660	3.9	698.5	698.5	699.0	0.5
BF	83,580	320	1,190	1.6	703.1	703.1	703.9	0.8
BG	84,350	260	1,080	1.8	704.5	704.5	705.5	1.0
BH	85,160	60	370	5.1	708.0	708.0	708.6	0.6

'Feet above mouth

BEST DOCUMENT AVAILABLE

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

MINGO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Douglas Creek								
A	2,430	840	8,130	0.6	613.4	613.0[2]	614.0[2]	1.0
B	3,790	380	1,340	3.6	614.4	614.4	614.9	0.5
C	4,710	510	3,280	1.2	618.4	618.4	618.9	0.5
D	5,730	400	1,500	2.7	618.8	618.8	619.6	0.8
E	6,580	220	1,260	3.2	621.1	621.1	622.1	1.0
F	7,500	120	920	4.4	623.9	623.9	624.9	1.0
Mill Creek								
A	1,950	350	2,410	3.6	631.7	631.7	632.7	1.0
B	2,350	400	2,180	4.0	632.3	632.3	633.2	0.9
C	3,480	500	1,920	2.6	634.4	634.4	635.3	0.9
D	4,020	210	690	7.2	635.2	635.2	636.1	0.9
E	4,620	200	1,330	3.7	640.9	640.9	641.3	0.4
F	5,040	200	1,280	3.9	641.7	641.7	642.1	0.4
G	6,000	300	1,220	4.1	644.9	644.9	645.0	0.1
H	7,500	150	790	5.8	650.8	650.8	651.2	0.4
I	8,460	150	820	5.6	657.1	657.1	657.2	0.1
J	10,050	*	*	*	670.4	*	*	*
K	10,630	*	*	*	675.5	*	*	*
L	11,370	*	*	*	679.2	*	*	*

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects
*Floodway not applicable (creek flows underground)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

DOUGLAS CREEK-MILL CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Mill Creek (continued)								
M	11,700	*	*	*	681.2	*	*	*
N	12,030	*	*	*	684.8	*	*	*
O	12,260	*	*	*	687.0	*	*	*
P	12,450	*	*	*	688.4	*	*	*
Q	13,000	*	*	*	693.3	*	*	*
R	13,750	*	*	*	697.1	*	*	*
S	14,530	100	660	4.4	703.2	703.2	704.2	1.0
T	15,270	180	1,060	2.7	708.9	708.9	709.0	0.1
U	15,970	150	1,180	2.4	718.1	718.1	718.1	0.0
V	16,800	200	1,020	2.8	723.5	723.5	723.7	0.2
W	17,180	200	1,390	2.1	728.0	728.0	729.0	1.0
X	17,480	80	450	4.4	728.5	728.5	729.4	0.9
Jones Creek								
A	300	170	1,300	3.1	633.5	633.5	634.5	1.0
B	1,260	190	1,160	3.4	636.5	636.5	636.8	0.3
C	2,490	100	480	5.8	641.9	641.9	642.2	0.3
D	3,580	170	960	2.9	646.3	646.3	647.2	0.9
E	4,730	160	710	2.8	653.3	653.3	654.2	0.9

[1]Feet above mouth
*Floodway not applicable (creek flows underground)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

MILL CREEK-JONES CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Jones Creek (continued)								
F	6,140	370	1,680	1.2	657.7	657.7	657.9	0.2
G	6,510	360	920	1.2	662.5	662.5	662.5	0.0
H	7,390	370	800	1.4	669.4	669.4	669.4	0.0
I	7,980	*	*	*	673.0	*	*	*
J	8,730	*	*	*	678.7	*	*	*
K	9,150	*	*	*	682.0	*	*	*
L	9,640	*	*	*	686.2	*	*	*
M	9,950	*	*	*	686.6	*	*	*
Audubon Creek								
A	1,530	70	610	8.5	643.0	642.0[2]	643.0[2]	1.0
B	2,690	70	570	8.5	644.6	644.6	645.2	0.6
C	3,250	600	1,900	2.6	648.2	648.2	648.7	0.5
D	4,020	590	1,550	3.2	649.5	649.5	649.9	0.4
E	4,940	550	1,080	4.3	655.3	655.3	655.3	0.0
F	5,590	160	930	5.0	657.7	657.7	658.7	1.0
G	5,910	210	1,022	4.2	659.2	659.2	660.2	1.0
H	7,390	70	540	4.7	662.1	662.1	663.1	1.0
I	8,020	80	580	4.4	663.1	663.1	663.8	0.7

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects

*Floodway not determined (flows remain within channel)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

JONES CREEK-AUDUBON CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Audubon Creek (continued)								
J	9,090	50	510	7.3	668.6	668.6	669.3	0.7
K	9,830	50	540	6.3	671.5	671.5	672.3	0.8
L	10,830	90	490	6.0	673.6	673.6	674.6	1.0
M	11,220	50	380	7.6	676.2	676.2	676.7	0.5
N	11,640	40	310	8.8	682.4	682.4	682.7	0.3
Bell Creek								
A	270	120	910	7.1	645.1	645.1	646.1	1.0
B	1,300	100	840	5.4	648.3	648.3	648.6	0.3
C	1,870	90	560	8.1	648.8	648.8	649.1	0.3
D	2,800	100	670	6.7	652.0	652.0	652.2	0.2
E	4,110	60	340	6.2	656.8	656.8	657.0	0.2
F	4,760	320	1,050	2.3	660.2	660.2	661.2	1.0
G	5,550	70	300	4.6	662.0	662.0	662.7	0.7
H	5,880	60	320	4.4	662.8	662.8	663.6	0.8
I	6,110	160	620	2.3	667.3	667.3	667.3	0.0
J	6,430	40	560	5.5	669.9	669.9	669.9	0.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

AUDUBON CREEK-BELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Bell Creek Tributary								
A	260	200	1,100	2.0	656.4	656.4	657.4	1.0
B	780	80	600	3.8	656.5	656.5	657.5	1.0
C	1,160	300	1,620	1.4	661.1	661.1	662.1	1.0
D	1,540	470	2,680	0.8	661.3	661.3	662.3	1.0
E	1,890	430	2,500	0.8	664.1	664.1	665.1	1.0
F	2,470	290	1,080	2.0	664.4	664.4	665.4	1.0
G	3,320	210	850	2.1	667.4	667.4	668.0	0.6
H	3,760	70	330	5.5	667.9	667.9	668.8	0.9
I	4,350	50	230	7.7	671.3	671.3	671.4	0.1
J	4,810	60	320	5.6	674.8	674.8	674.9	0.1
K	5,770	70	360	3.6	676.3	676.3	676.9	0.6
L	6,800	50	180	7.3	680.3	680.3	680.3	0.0
Fulton Creek								
A	320	130	570	3.5	649.1	649.1	649.9	0.8
B	880	60	440	4.6	649.7	649.7	650.6	0.9
C	1,500	40	310	6.4	650.5	650.5	651.5	1.0
D	1,830	60	280	7.2	652.4	652.4	653.2	0.8
E	2,520	60	300	6.0	655.8	655.8	656.8	1.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

BELL CREEK TRIBUTARY-FULTON CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Fulton Creek (continued)								
F	3,020	50	280	6.4	658.1	658.1	658.4	0.3
G	4,020	70	400	4.4	662.6	662.6	663.6	1.0
H	4,640	40	310	5.1	664.6	664.6	665.5	0.9
I	5,400	50	330	4.7	666.9	666.9	667.6	0.7
Alsuma Creek								
A	280	50	250	5.8	657.9	657.9	658.7	0.8
B	790	120	290	5.1	662.8	662.8	663.8	1.0
C	1,290	130	430	3.4	665.2	665.2	666.1	0.9
D	1,460	180	330	4.2	665.6	665.6	666.3	0.7
E	1,940	200	570	2.4	667.6	667.6	668.6	1.0
F	2,920	320	1,870	0.7	670.7	670.7	671.7	1.0
G	3,460	160	830	1.5	671.1	671.1	672.0	0.9
H	3,940	380	1,080	1.2	672.6	672.6	673.3	0.7

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FULTON CREEK-ALSUMA CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Quarry Creek								
A	640	520	6,290	1.0	612.3	607.7[2]	608.7[2]	1.0
B	2,130	870	4,100	1.6	612.3	608.6[2]	609.5[2]	0.9
C	2,550	510	3,760	1.7	613.6	613.6	614.5	0.9
D	3,540	150	1,010	6.0	614.8	614.8	615.7	0.9
E	4,040	230	1,170	5.1	618.7	618.7	619.7	1.0
F	5,890	350	1,840	3.3	627.2	627.2	628.1	0.9
G	7,110	220	1,300	4.3	633.0	633.0	633.9	0.9
H	7,580	190	1,290	4.3	634.1	634.1	635.0	0.9
I	8,330	200	860	6.5	636.6	636.6	637.5	0.9
J	9,320	350	1,430	3.8	642.1	642.1	643.1	1.0
K	10,420	270	1,070	5.1	646.3	646.3	647.3	1.0
L	10,780	300	1,310	4.1	648.8	648.8	649.8	1.0
M	11,600	220	1,050	4.5	653.1	653.1	654.0	0.9
N	12,690	320	1,330	2.2	657.9	657.9	658.8	0.9
O	13,940	160	870	3.5	667.4	667.4	668.3	0.9
P	14,790	220	1,370	2.1	670.5	670.5	671.4	0.9
Q	16,800	180	820	2.9	680.8	680.8	681.8	1.0

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

QUARRY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Eagle Creek								
A	3,210	280	760	3.0	613.9	613.9	614.8	0.9
B	3,770	190	600	3.8	615.3	615.3	616.1	0.8
C	4,290	170	880	2.3	619.8	619.8	620.6	0.8
D	4,580	490	5,110	0.4	629.3	629.3	630.2	0.9
E	5,670	280	1,910	1.1	629.4	629.4	630.3	0.9
F	6,750	130	360	5.1	632.8	632.8	633.1	0.3
G	7,150	210	480	3.9	635.7	635.7	636.1	0.4
H	7,700	330	1,190	1.6	642.6	642.6	643.4	0.8
I	8,860	220	610	3.1	646.7	646.7	647.3	0.6
J	9,440	280	1,410	1.1	648.7	648.7	649.7	1.0
K	10,810	170	550	2.7	651.6	651.6	652.1	0.5
L	12,020	240	680	2.2	656.5	656.5	657.0	0.5
Cooley Creek								
A	2,580	640	5,100	1.4	630.5	630.5	631.0	0.5
B	3,550	720	4,300	1.6	630.7	630.7	631.3	0.6
C	3,990	540	2,060	3.3	631.1	631.1	632.1	1.0
D	4,600	270	1,340	6.1	634.7	634.7	635.5	0.8
E	4,940	260	1,150	7.1	638.0	638.0	638.3	0.3
F	5,530	150	1,220	6.6	641.5	641.5	642.4	0.9

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

EAGLE CREEK-COOLEY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE'	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Cooley Creek (continued)								
G	5,900	310	2,370	3.4	644.0	644.0	645.0	1.0
H	6,290	300	2,588	3.1	645.3	645.3	646.3	1.0
I	7,150	562	2,690	3.0	646.4	646.4	647.2	0.8
J	8,130	195	995	8.0	648.2	648.2	648.2	0.0
K	8,590	422	917	8.7	653.6	653.6	654.3	0.7
L	8,990	290	2,690	3.1	655.0	655.0	655.9	0.9
M	9,450	180	1,440	5.5	655.7	655.7	656.6	0.9
N	10,130	150	740	5.7	657.1	657.1	658.0	0.9
O	11,100	100	660	6.4	662.4	662.4	663.4	1.0
P	11,730	150	1,690	2.3	670.3	670.3	670.9	0.6
Q	12,560	330	2,700	1.4	675.2	675.2	675.5	0.3
R	13,300	410	2,190	1.8	675.3	675.3	675.6	0.3
S	14,310	610	4,770	0.8	683.6	683.6	684.4	0.8
T	15,250	220	1,300	3.0	683.7	683.7	684.4	0.7
U	15,970	200	770	4.5	684.4	684.4	685.2	0.8
V	16,730	140	450	7.7	691.1	691.1	691.3	0.2
W	17,900	440	1,030	1.8	694.5	694.5	695.5	1.0

'Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

COOLEY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Cooley Creek Tributary								
A	640	180	1,090	3.3	657.5	657.5	658.5	1.0
B	1,120	150	780	4.5	659.8	659.8	660.7	0.9
C	2,000	170	1,090	3.3	668.2	668.2	669.1	0.9
D	2,810	180	890	4.0	674.4	674.4	675.4	1.0
E	2,970	190	1,590	2.1	674.9	674.9	675.9	1.0
F	3,430	260	2,370	1.4	678.5	678.5	679.5	1.0
G	3,860	220	1,670	2.0	678.6	678.6	679.6	1.0
H	4,510	170	810	4.2	679.3	679.3	680.2	0.9
I	5,170	100	450	5.9	681.8	681.8	682.7	0.9
J	5,590	170	700	3.8	685.6	685.6	686.5	0.9
K	6,780	170	840	3.1	692.3	692.3	693.2	0.9
L	7,430	240	940	2.8	696.0	696.0	696.9	0.9
M	8,380	230	950	2.8	699.5	699.5	700.4	0.9
N	9,520	180	660	3.3	703.6	703.6	704.5	0.9
O	10,000	200	620	3.5	706.6	706.6	707.6	1.0
P	10,660	100	320	6.8	710.3	710.3	711.0	0.7
Q	11,050	90	450	4.8	713.7	713.7	714.7	1.0
R	11,790	150	720	3.0	716.2	716.2	717.2	1.0
S	12,220	80	410	5.3	717.7	717.7	718.6	0.9

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

COOLEY CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Cooley Creek Tributary (continued)								
T	12,870	110	550	3.9	721.1	721.1	722.0	0.9
U	13,890	100	490	4.4	724.9	724.9	725.8	0.9
V	14,400	80	400	4.2	727.5	727.5	728.4	0.9
W	14,590	90	499	3.4	728.6	728.6	729.5	0.9
X	15,400	60	370	4.6	732.2	732.2	733.2	1.0
Y	16,770	70	470	3.7	738.3	738.3	739.2	0.9
Z	18,220	60	370	4.6	744.8	744.8	745.2	0.4
AA	19,610	90	280	6.0	754.8	754.8	755.2	0.4
Tupelo Creek								
A	1,430	160	1,060	4.6	626.0	626.0	627.0	1.0
B	2,240	100	680	7.2	628.3	628.3	629.3	1.0
C	2,700	220	1,290	3.8	630.1	630.1	631.0	0.9
D	3,530	700	3,280	1.5	631.3	631.3	632.3	1.0
E	3,780	350	1,010	4.9	633.3	633.3	633.6	0.3
F	4,160	160	1,260	3.9	635.2	635.2	636.0	0.8
G	5,360	270	1,410	3.5	639.8	639.8	640.8	1.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

COOLEY CREEK TRIBUTARY - TUPELO CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Tupelo Creek (continued)								
H	6,280	250	1,600	3.1	642.2	642.2	643.2	1.0
I	7,310	450	1,910	2.2	644.4	644.4	645.4	1.0
J	7,950	160	970	4.3	646.3	646.3	647.2	0.9
K	8,500	600	1,990	2.1	650.0	650.0	650.9	0.9
L	8,900	220	880	3.4	650.4	650.4	651.3	0.9
M	9,640	140	780	3.9	653.8	653.8	654.2	0.4
N	10,080	320	1,160	2.6	656.0	656.0	656.9	0.9
O	10,530	80	560	5.4	657.6	657.6	658.4	0.8
P	10,790	50	380	7.8	657.6	657.6	658.6	1.0
Q	11,240	150	720	4.1	661.1	661.1	661.9	0.8
R	12,140	100	300	6.1	662.9	662.9	663.2	0.3
S	12,830	220	910	2.0	667.1	667.1	667.7	0.6
T	13,980	270	500	3.7	671.6	671.6	672.6	1.0
Tupelo Creek Tributary								
A	740	300	250	5.8	654.0	654.0	654.7	0.7
B	1,180	100	330	4.4	659.3	659.3	660.1	0.8

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

TUPELO CREEK - TUPELO CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Tupelo Creek Tributary (continued)								
C	1,690	90	370	4.0	663.4	663.4	664.4	1.0
D	2,030	120	460	3.2	667.4	667.4	668.4	1.0
E	2,380	180	800	1.8	669.6	669.6	670.6	1.0
F	2,790	80	200	5.9	669.7	669.7	670.5	0.8
G	3,190	*	*	*	675.1	*	*	*
H	3,850	*	*	*	681.8	*	*	*
Brookhollow Creek								
A	1,250	180	1,510	3.9	645.9	645.9	646.9	1.0
B	2,700	290	1,920	3.1	649.7	649.7	650.7	1.0
C	3,460	270	2,350	2.5	650.7	650.7	651.7	1.0
D	4,170	340	2,190	2.7	652.0	652.0	653.0	1.0
E	4,700	120	1,260	4.7	652.5	652.5	653.5	1.0
F	5,180	130	1,120	5.3	654.2	654.2	654.9	0.7
G	5,800	80	680	5.8	656.6	656.6	656.9	0.3
H	6,570	160	1,230	3.2	661.4	661.4	662.1	0.7

[1]Feet above mouth
*Floodway not applicable (School Park)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

47 TUPELO CREEK TRIBUTARY - BROOKHOLLOW CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Brookhollow Creek (continued)								
I	7,550	90	640	6.1	664.2	664.2	665.2	1.0
J	8,300	160	1,040	3.8	669.0	669.0	669.6	0.6
K	8,970	170	790	5.0	673.1	673.1	674.1	1.0
L	9,500	60	930	7.0	678.1	678.1	679.1	1.0
M	10,140	200	870	4.6	683.3	683.3	684.1	0.8
N	10,760	230	1,090	3.6	687.2	687.2	688.2	1.0
O	11,660	200	1,300	3.0	692.2	692.2	693.2	1.0
P	12,200	380	2,010	1.6	693.9	693.9	694.9	1.0
Q	12,720	350	1,170	2.8	695.1	695.1	696.0	0.9
R	13,130	180	850	3.9	698.0	698.0	698.9	0.9
S	13,830	100	700	4.7	701.3	701.3	702.3	1.0
T	14,400	90	650	5.1	703.4	703.4	704.2	0.8
U	15,000	80	640	5.2	706.9	706.9	707.5	0.6
V	16,230	60	540	4.3	710.0	710.0	710.8	0.8
W	16,900	80	420	5.4	710.7	710.7	711.6	0.9
X	17,290	50	250	9.3	712.7	712.7	712.8	0.1
Y	17,780	140	520	4.4	720.3	720.3	720.6	0.3
Z	19,060	120	550	2.1	725.7	725.7	726.5	0.8
AA	19,760	80	340	3.4	728.4	728.4	729.3	0.9

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

BROOKHOLLOW CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Brookhollow Creek Tributary								
A	1,580	90	700	3.1	659.0	659.0	659.9	0.9
B	2,530	110	760	2.7	663.7	663.7	664.4	0.7
C	3,260	290	540	3.8	665.9	665.9	666.8	0.9
D	3,710	480	920	2.2	668.9	668.9	669.9	1.0
E	4,310	150	610	3.4	672.5	672.5	673.5	1.0
F	4,710	120	580	3.6	674.9	674.9	675.9	1.0
G	5,410	70	520	3.0	678.4	678.4	679.3	0.9
H	5,930	80	300	5.2	679.6	679.6	680.5	0.9
I	6,370	90	220	7.2	684.7	684.7	684.7	0.0
J	6,700	70	250	6.3	688.3	688.3	688.5	0.2
K	7,210	140	400	3.9	692.2	692.2	692.3	0.1
Sugar Creek								
A	1,960	80	540	4.1	651.3	651.3	651.7	0.4
B	2,980	230	890	2.4	656.7	656.7	657.4	0.7
C	4,210	70	480	4.4	660.9	660.9	661.6	0.7
D	4,830	80	510	4.0	662.6	662.6	663.4	0.8
E	5,220	100	440	4.6	664.6	664.6	665.4	0.8

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

41 BROOKHOLLOW CREEK TRIBUTARY-SUGAR CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Sugar Creek (continued)								
F	5,730	190	750	2.6	666.9	666.9	667.8	0.9
G	7,080	480	1,720	1.0	670.4	670.4	671.4	1.0
H	8,020	140	650	2.5	672.9	672.9	673.5	0.6
I	9,330	70	290	5.4	678.6	678.6	678.6	0.0
J	10,440	120	550	2.7	683.7	683.7	684.7	1.0
K	11,340	100	580	2.5	687.7	687.7	688.7	1.0
L	12,100	190	670	2.1	689.7	689.7	690.0	0.3
M	12,700	141	620	2.2	694.0	694.0	694.5	0.5
Southpark Creek								
A	1,660	210	830	1.8	656.3	656.3	657.1	0.8
B	2,380	250	810	1.8	657.2	657.2	658.1	0.9
C	2,880	160	340	4.5	659.5	659.5	660.3	0.8
D	3,750	140	430	3.1	661.6	661.6	662.6	1.0
E	4,360	100	410	3.3	663.6	663.6	664.5	0.9
F	4,980	170	720	1.8	664.1	664.1	665.0	0.9
G	6,150	160	610	2.0	666.6	666.6	667.5	0.9
H	6,890	110	390	3.1	668.7	668.7	669.4	0.7

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

50

SUGAR CREEK-SOUTHPARK CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 8 Southpark Creek (continued)								
I	7,540	230	830	1.5	671.7	671.7	672.4	0.7
J	8,580	140	470	2.1	672.9	672.9	673.4	0.5
K	9,400	190	510	1.9	675.5	675.5	676.1	0.6
Ford Creek								
A	870	220	1,403	1.8	660.7	660.7	661.7	1.0
B	2,510	180	1,090	2.3	663.1	663.1	664.1	1.0
C	3,670	330	1,090	2.3	664.6	664.6	665.6	1.0
D	4,900	210	740	3.4	666.7	666.7	667.6	0.9
E	7,415	221	864	2.6	671.3	671.3	672.2	0.9
F	9,065	166	677	3.3	675.0	675.0	675.8	0.8
G	9,595	99	536	4.2	675.9	675.9	676.8	0.9
H	11,210	33	224	8.6	682.1	682.1	682.1	0.0
I	12,890	94	520	3.7	690.0	690.0	690.3	0.3
J	13,480	86	428	4.5	691.4	691.4	691.6	0.2
K	13,800	94	503	3.8	693.0	693.0	693.2	0.2
L	14,100	68	198	9.8	698.5	698.5	698.5	0.0
M	14,760	67	290	6.7	702.2	702.2	702.8	0.6

[1]Feet above mouth

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT)	SECTION AREA (SQ FT)	MEAN VELOCITY (F P S)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 3 Ford Creek (continued)								
N	15,500	55	283	6.8	706.0	706.0	706.7	0.7
O	15,720	100	370	4.3	708.0	708.0	708.5	0.5
P	16,550	140	600	2.6	711.4	711.4	712.2	0.8
Q	17,500	310	1,230	1.3	717.9	717.9	718.7	0.8
R	17,900	170	630	2.5	721.1	721.1	722.1	1.0
Catfish Creek								
A	1,460	150	830	2.7	668.6	668.6	669.6	1.0
B	2,100	50	350	6.5	669.6	669.6	670.6	1.0
C	3,270	150	630	2.6	672.5	672.5	673.3	0.8
D	4,410	100	430	3.8	674.8	674.8	675.8	1.0
E	5,590	160	530	3.1	679.8	679.8	680.8	1.0
F	6,360	220	600	2.7	682.5	682.5	683.5	1.0
Watershed Unit No. 9 Spunky Creek Tributary A								
A	8,213	212	1,043	1.3	634.2	634.2	635.2	1.0
B	9,000	78	404	3.4	637.5	637.5	638.5	1.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FORD CREEK-CATFISH CREEK-SPUNKY CREEK TRIBUTARY A

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 9 Spunky Creek Tributary A (continued)								
C	9,870	50	221	6.2	643.5	643.5	643.6	0.1
D	11,450	128	449	3.1	651.3	651.3	652.2	0.9
E	12,880	74	241	5.7	659.0	659.0	660.0	1.0
Spunky Creek Tributary B								
A	1,680	91	894	4.7	628.5	628.5	629.1	0.6
B	2,850	347	1,763	2.6	629.8	629.8	630.6	0.8
C	4,200	334	1,067	4.3	631.8	631.8	632.8	1.0
D	6,880	163	527	6.3	639.1	639.1	640.0	0.9
E	9,700	185	1,000	2.9	658.2	658.2	659.1	0.9
F	10,530	124	320	5.8	660.3	660.3	661.0	0.7
G	12,150	175	598	3.1	668.9	668.9	669.9	1.0

[1]Feet above mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 9								
Spunky Creek Tributary B-1								
A	550	58	299	4.2	632.3	631.4[2]	632.4[2]	1.0
B	2,400	89	315	4.0	640.2	640.2	641.1	0.9
C	5,380	52	204	6.2	651.9	651.9	652.9	1.0
D	6,120	62	279	4.5	655.6	655.6	656.6	1.0
E	7,730	42	177	7.1	662.8	662.8	663.8	1.0
F	8,800	27	121	10.5	670.7	670.7	670.7	0.0
Watershed Unit No. 10								
Harlow Creek								
F	6,712	*	*	*	659.4	*	*	*
G	7,938	80	1,048	4.5	661.2	661.2	661.2	0.0
H	8,588	80	1,125	4.1	661.2	661.2	661.3	0.1
I	8,711	100	1,038	4.4	661.3	661.3	661.4	0.1
J	9,505	225	2,189	2.1	661.3	661.3	662.2	0.9
K	10,465	225	1,906	2.4	661.4	661.4	662.4	1.0
L	11,515	200[3]	1,218	3.8	661.8	661.8	662.8	1.0
M	12,965	157[3]	612	5.5	664.3	664.3	665.0	0.7
N[4]	14,465	128	745	4.6	668.9	668.9	669.9	1.0

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects
[3]This width extends beyond corporate limits *Floodway not applicable, creek bounded by levee
[4]Located outside corporate limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

SPUNKY CREEK TRIBUTARY B-1-HARLOW CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Harlow Creek Tributary								
E	3,684	175	589	5.1	665.3	665.3	665.4	0.1
F	4,644	170	626	4.8	665.7	665.7	666.7	1.0
G	5,019	75	416	7.1	670.1	670.1	670.1	0.0
H	7,319	70	386	6.0	682.4	682.4	682.4	0.0
Blackboy Creek								
A-B	*	*	*	*	*	*	*	*
C	2,844	856	12,532	0.7	655.6	656.6	656.6	0.0
D-H	*	*	*	*	*	*	*	*
I	9,383	125	612	6.1	670.3	670.3	671.3	1.0

[1]Feet above mouth

*Located outside corporate limits.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

HARLOW CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 11 Vensel Creek								
A	1,700	*	*	*	614.8	*	*	*
B	3,800	*	*	*	615.6	*	*	*
C	5,800	*	*	*	616.4	*	*	*
D	8,200	*	*	*	623.5	*	*	*
E	9,800	*	*	*	627.9	*	*	*
F	11,600	96	706	5.7	639.4	639.4	640.3	0.9
G	12,450	86	672	5.8	646.1	646.1	646.2	0.1
H	13,100	232	160	3.5	651.0	651.0	651.8	0.8
I	13,750	200	278	7.3	654.5	654.5	655.1	0.6
J	14,900	105	309	7.9	658.5	658.5	659.5	1.0
K	16,350	58	228	10.1	668.1	668.1	669.0	0.9
L	18,450	84	227	4.7	677.3	677.3	677.3	0.0
M	20,550	109	375	1.6	707.5	707.5	707.5	0.0
N	22,050	23	75	10.3	714.2	714.2	714.3	0.1
Fred Creek								
A	600	80	883	6.4	616.1	614.8[2]	614.8[2]	0.0
B	2,923	153	1,379	4.1	620.9	620.9	621.8	0.9
C	4,698	129	1,270	3.6	621.8	621.8	622.7	0.9

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects
*Floodway not applicable (right bank overflow)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

VENSEL CREEK-FRED CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 11 Fred Creek (continued)								
D	6,541	140	1,127	4.2	623.1	623.1	623.8	0.7
E	9,131	74	482	6.0	628.7	628.7	629.2	0.5
F	9,706	80	748	3.9	631.1	631.1	631.6	0.5
G	12,181	116	798	5.2	644.0	644.0	644.6	0.6
H	14,547	78	524	7.8	654.7	654.7	654.7	0.0
I	15,877	192	843	4.9	663.6	663.6	664.3	0.7
J	17,677	139	1,095	3.7	673.9	673.9	674.5	0.6
K	18,615	142	910	4.0	680.4	680.4	681.4	1.0
L	19,615	75	576	6.3	687.7	687.7	688.3	0.6
M	21,359	65	227	6.1	701.1	701.1	702.0	0.9
Joe Creek								
A	1,000	240[2]	*	*	618.7	*	*	*
B	4,600	190[2]	*	*	622.5	*	*	*
C	7,520	200[2]	*	*	626.9	*	*	*
D	10.720	100[2]	*	*	634.3	*	*	*
E	11,769	100[2]	*	*	637.5	*	*	*
F	15,014	115[2]	*	*	640.9	*	*	*
G	17,910	85[2]	*	*	650.9	*	*	*

[1]Feet above mouth
[2]100-year flood plain designated as floodway

*Floodway not computed (flows remain in channel)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FRED CREEK-JOE CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 11 South Fork Joe Creek								
A	350	34	180	13.2	648.5	646.6[2]	646.6[2]	0.0
B	2,566	45	354	6.8	664.3	664.3	664.4	0.1
C	4,500	174	567	3.5	679.8	679.8	680.5	0.7
D	6,983	1880	196	8.0	697.0	697.0	697.2	0.2
Little Joe Creek								
A	644	75	725	10.1	651.3	651.3	651.3	0.0
B	1,532	55	704	10.4	655.1	655.1	655.1	0.0
C	3,182	60	364	20.2	659.7	659.7	659.7	0.0
D	4,082	90	488	17.2	665.4	665.4	665.4	0.0
E	6,011	173	1,184	5.6	680.1	680.1	680.9	0.8
F	6,911	85	783	4.5	688.7	688.7	689.0	0.3
G	9,021	197	875	4.0	697.7	697.7	698.0	0.3
H	10,403	189	625	0.9	706.0	706.0	707.0	1.0
I	11,933	114	474	1.9	718.0	718.0	719.0	1.0
J	13,333	219	1,336	0.7	720.3	720.3	721.3	1.0

[1]Feet above mouth
[2]Water-surface elevation computed without consideration of backwater effects.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

SOUTH FORK JOE CREEK-LITTLE JOE CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 11 South Fork Little Joe Creek								
A	500	73	486	3.2	690.1	690.1	690.8	0.7
B	1,980	78	293	5.3	700.7	700.7	700.7	0.0
C	4,110	166	313	3.0	720.0	720.0	721.0	1.0
D	5,070	95	207	4.6	728.8	728.8	729.1	0.3
North Fork Little Joe Creek								
A	350	51	488	3.9	682.3	682.3	683.1	0.8
B	975	40	216	8.8	685.2	685.2	685.8	0.6
C	1,900	460	2,161	0.9	695.0	695.0	695.0	0.0
D	3,260	282	1,366	1.4	698.3	698.3	699.3	1.0
East Branch Joe Creek								
H	21,000	54	422	7.8	665.9	665.9	665.9	0.0
I	22,548	69	409	5.2	669.3	669.3	669.9	0.6

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

SOUTH FORK LITTLE JOE CREEK-NORTH FORK LITTLE JOE CREEK EAST BRANCH JOE CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 11 Crow Creek								
A	100	68	602	7.5	628.6	628.6	628.6	0.0
B	1,800	58	483	9.3	636.4	636.4	636.4	0.0
C	3,300	78	715	6.3	646.4	646.4	646.4	0.0
D	4,550	130	1,062	4.3	651.3	651.3	651.7	0.4
E	5,350	139	709	6.4	655.3	655.3	655.8	0.5
F	6,770	147	1,202	3.6	664.3	664.3	665.1	0.8
G	8,300	317	1,434	3.0	669.9	669.9	669.9	0.0
H	9,750	238	1,740	2.5	679.7	679.7	680.2	0.5
Watershed Unit No. 12 Hager Creek								
C	7,920	533	1,760	0.8	628.1	628.1	628.6	0.5
D	9,250	640	1,390	1.0	628.5	628.5	629.0	0.5
E	12,240	481	1,954	1.8	629.1	629.1	630.1	1.0
F	14,382	492	3,109	1.1	638.9	638.9	639.8	0.9
G	17,392	99	606	2.2	661.4	661.4	662.0	0.6
H	19,582	50	236	5.7	681.5	681.5	681.8	0.3

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

CROW CREEK-HAGER CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 12 Mooser Creek								
A	770	85	930	6.9	627.1	627.1	627.6	0.5
B	2,420	305	2,640	2.2	633.4	633.4	634.4	1.0
C	4,750	71	658	8.6	638.3	638.3	638.7	0.4
D	5,990	106	1,148	4.9	646.9	646.9	647.8	0.9
E	7,300	329	2,416	2.2	651.5	651.5	652.5	1.0
F	10,200	156	933	3.0	663.4	663.4	664.3	0.9
G	12,200	68	342	7.3	673.5	673.5	673.5	0.0
H	13,650	95	500	5.0	686.6	686.6	686.7	0.1
I	14,620	57	436	5.3	688.9	688.9	689.4	0.5
J	14,900	88	950	2.4	694.3	694.3	694.9	0.6
K*	16,650	80	466	4.9	707.7	707.7	707.9	0.2
L	17,450	144/100[2]	592	3.9	713.2	713.2	714.2	1.0
Mooser Creek Tributary								
A	1,680	135	809	3.4	661.8	661.8	661.8	0.0
B	3,780	161	1,186	2.3	669.9	669.9	670.7	0.8
C	5,860	191	1,035	2.4	677.3	677.3	677.3	0.0

[1]Feet above mouth
[2]Total width/width within corporate limits
* Outside corporate limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

MOOSER CREEK-MOOSER CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 12 Cherry Creek (West Tulsa)								
A	1,700	75	771	7.8	625.7	624.2[3]	625.0[3]	0.8
B	3,850	115	1,128	5.1	629.9	629.9	630.2	0.3
C	6,100	1135	2,708	2.1	632.5	632.5	633.2	0.7
D	6,950	1213	2,830	0.6	632.9	632.9	633.8	0.9
E	8,500	86	486	3.7	633.2	633.2	634.2	1.0
Red Fork Creek								
A	800	60	561	8.0	637.5	637.5	637.5	0.0
B	1,325	445	415	10.8	642.5	642.5	642.5	0.0
C	2,680	386	1,228	3.7	644.5	644.5	645.1	0.6
D	3,620	123	820	4.8	649.3	649.3	650.3	1.0
Nickel Creek								
B	11,920	1248/1160[2]	6,410	1.2	634.2	634.2	635.2	1.0
C	12,800	880/350[2]	3,878	2.1	634.9	634.9	635.8	0.9

[1]Feet above mouth
[2]Total width/width within corporate limits
[3]Water-surface elevation computed without consideration of backwater effects.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

CHERRY CREEK (WEST TULSA)-RED FORK CREEK-NICKEL CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Haikey Creek								
BA	39,160	1590	8,110	2.5	636.7	636.7	637.5	0.8
BB	40,380	1300	6,750	3.0	637.7	637.7	638.5	0.8
BC	41,290	1160	6,010	3.4	639.1	639.1	639.9	0.8
West Branch Haikey Creek								
I	4,790	190	1,290	1.5	674.0	674.0	674.0	0.0
J	4,850	190	1,300	1.5	674.0	674.0	674.0	0.0
K	5,360	230	880	2.2	674.3	674.3	674.5	0.2
L	6,600	130	820	2.4	676.8	676.8	676.9	0.1
M	7,110	240	1,460	1.3	677.4	677.4	677.6	0.2
N	7,930	130	780	2.5	678.4	678.4	678.6	0.2
O	8,550	90	610	2.3	679.9	679.9	680.1	0.2
P	9,170	100	600	2.4	681.3	681.3	681.6	0.3
Q	10,930	80	420	2.8	686.6	686.6	687.0	0.4
R	11,920	210	790	1.5	689.9	689.9	690.1	0.2
S	12,250	120	540	1.9	690.7	690.7	690.8	0.1
T	13,130	110	480	2.1	693.1	693.1	693.1	0.0
U	13,600	180	520	2.0	694.6	694.6	694.6	0.0

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

HAIKEY CREEK - WEST BRANCH HAIKEY CREEK

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Little Haikey Creek								
K	14,400	540	4,250	1.4	647.1	647.1	647.3	0.2
L	15,720	190	1,100	5.4	647.6	647.6	647.9	0.3
M	16,720	470	1,840	3.2	652.4	652.4	652.6	0.2
N	18,200	590	2,620	2.3	654.1	654.1	654.3	0.2
O	19,050	530	1,840	3.3	655.5	655.5	655.6	0.1
P	20,150	500	2,080	2.9	658.3	658.3	658.4	0.1
Q	20,800	390	1,240	4.8	660.0	660.0	660.1	0.1
R	21,710	190	890	6.7	661.6	661.6	661.8	0.2
S	22,900	90	570	9.7	663.3	663.3	663.6	0.3
T	23,380	430	1,580	3.5	667.0	667.0	667.9	0.9
U	24,030	450	2,350	2.4	668.2	668.2	668.9	0.7
V	24,750	340	1,560	3.6	668.8	668.8	669.6	0.8
W	24,850	370	2,010	2.8	671.0	671.0	672.0	1.0
X	26,300	270	1,540	3.1	673.0	673.0	673.9	0.9
Y	26,750	250	930	5.2	674.3	674.3	674.8	0.5
Z	27,520	320	1,670	2.9	676.4	676.4	676.7	0.3
AA	28,150	360	1,460	3.3	677.4	677.4	677.7	0.3
AB	28,900	480	1,890	2.6	678.4	678.4	678.8	0.4
AC	30,150	530	1,200	4.1	680.7	680.7	681.4	0.7

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

LITTLE HAIKEY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Little Haikey Creek (continued)								
AD	31,250	350	1,506	2.7	683.6	683.6	683.8	0.2
AE	31,970	210	850	4.7	684.7	684.7	685.2	0.5
AF	32,470	230	1,036	3.9	687.2	687.2	687.9	0.7
AG	32,830	146	626	6.4	688.2	688.2	688.2	0.0
AH	33,280	149	756	5.3	688.9	688.9	689.1	0.2
AI	33,720	350	1,645	2.4	690.3	690.3	690.6	0.3
AJ	33,910	470	2,845	1.4	692.7	692.7	692.7	0.0
AK	34,320	470	2,877	1.4	692.8	692.8	692.8	0.0
AL	34,890	231	745	5.4	692.6	692.6	692.8	0.2
AM	35,280	330	986	4.1	695.3	695.3	695.7	0.4
AN	35,500	234	789	5.1	696.4	696.4	697.0	0.6
AO	35,750	209	1,162	3.4	698.0	698.0	698.4	0.4
AP	36,000	200	954	4.2	698.7	698.7	699.0	0.3
AQ	37,430	290	1,305	3.1	700.9	700.9	701.5	0.6
AR	37,910	230	963	4.2	703.7	703.7	703.7	0.0
AS	38,190	300	960	4.2	704.7	704.7	705.3	0.6
AT	38,510	270	1,221	3.3	706.3	706.3	706.6	0.3
AU	39,700	90	530	4.4	709.2	709.2	709.3	0.1
AV	40,510	133	452	5.1	714.2	714.2	714.3	0.1

[1]Feet above mouth

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Little Haikey Creek (continued)								
AW	41,100	225	655	3.5	716.7	716.7	717.2	0.5
AX	41,600	139	651	3.6	718.6	718.6	719.3	0.7
AY	41,720	107	555	4.2	719.9	719.9	720.3	0.4
AZ	42,350	99	622	2.4	724.0	724.0	724.1	0.1
Little Haikey Creek Tributary								
A	540	70	410	3.8	708.3	708.3	708.5	0.2
B	1,030	150	650	2.4	712.6	712.6	712.7	0.1
C	1,260	140	740	2.1	713.2	713.2	713.5	0.3
D	1,960	110	620	2.5	717.0	717.0	717.6	0.6
E	2,555	50	340	4.5	720.6	720.6	721.3	0.7
F	2,925	20	150	10.5	721.5	721.5	721.5	0.0
Fry Ditch No. 2								
BP	25,900	330	2,690	1.9	646.8	646.8	646.9	0.1
BQ	27,140	260	1,470	3.5	647.4	647.4	647.6	0.2
BR	28,400	210	1,230	4.2	649.3	649.3	650.0	0.7

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

LITTLE HAIKEY CREEK-LITTLE HAIKEY CREEK TRIBUTARY-FRY DITCH NO. 2

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Fry Ditch No. 2 (continued)								
BS	29,332	280	1,520	3.4	652.8	652.8	653.2	0.4
BT	29,960	370	1,540	3.3	653.7	653.7	654.3	0.6
BU	31,180	250	1,420	3.3	657.2	657.2	657.9	0.7
BV	32,360	160	870	5.4	659.7	659.7	660.6	0.9
BW	33,120	150	950	4.9	663.3	663.3	664.0	0.7
BX	33,260	200	1,370	3.4	664.0	664.0	664.8	0.8
BY	34,130	270	1,360	3.1	665.2	665.2	665.9	0.7
BZ	34,800	280	1,570	2.7	666.8	666.8	667.5	0.7
CA	35,700	200	740	4.6	669.6	669.6	670.1	0.5
CB	36,730	150	820	4.1	674.6	674.6	674.8	0.2
CC	37,480	180	800	4.2	676.8	676.8	677.2	0.4
CD	38,060	150	400	6.9	678.6	678.6	678.8	0.2
CE	38,420	160	820	3.3	683.0	683.0	683.1	0.1

[1]Feet above mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FRY DITCH NO. 2

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Watershed Unit No. 13 Fry Ditch No. 2 (continued)								
CF	39,280	120	660	4.2	684.2	684.2	684.9	0.7
CG	40,000	330	1,520	1.8	685.7	685.7	686.1	0.4
CH	40,200	160	370	7.4	687.8	687.8	687.8	0.0
CI	40,690	60	350	7.8	695.5	695.5	695.5	0.0
CJ	41,760	200	1,340	1.5	698.0	698.0	699.0	1.0
CK	42,100	150	610	3.4	698.4	698.4	699.2	0.8
CL	43,180	100	470	4.4	703.0	703.0	703.1	0.1
CM	43,830	100	477	4.4	705.5	705.5	705.6	0.1
CN	44,560	100	590	2.8	707.2	707.2	707.4	0.2
CO	44,700	100	310	5.3	711.4	711.4	711.4	0.0
CP	45,470	100	700	2.3	712.4	712.4	712.9	0.5
CQ	46,260	90	440	3.7	717.5	717.5	717.5	0.0
CR	47,020	80	390	3.3	720.1	720.1	720.1	0.0
CS	47,800	90	340	3.7	723.2	723.2	723.2	0.0
CT	48,440	80	360	3.5	726.1	726.1	726.1	0.0

[1] Feet above mouth

TABLE 3

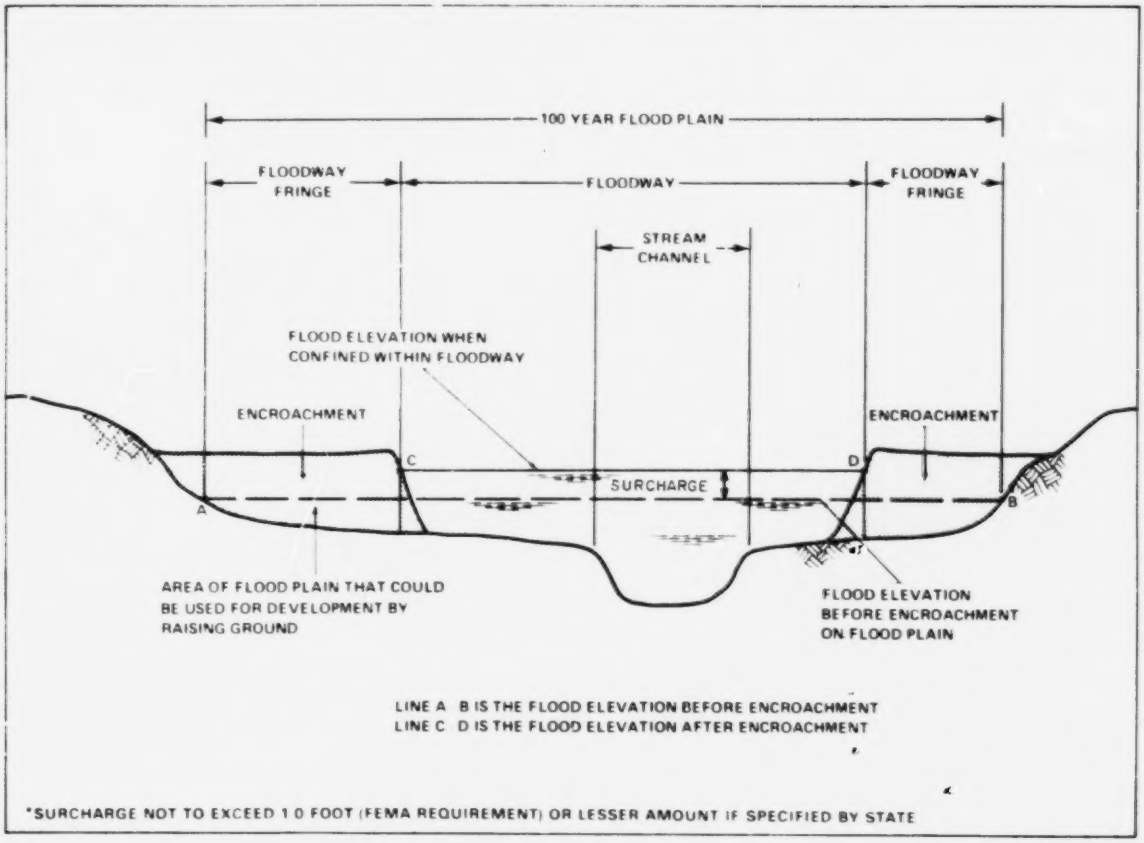
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOODWAY DATA

FRY DITCH NO.2


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 11

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the City of Tulsa.

BEST DOCUMENT AVAILABLE

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet

The reaches assigned to the streams studied in detail are shown on the profiles (Exhibit 1), and summarized in the Flood Insurance Zone Data Table (Table 4).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the City of Tulsa was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1 through A15, A17, and A23:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone AO:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; average depths are shown, but no Flood Hazard Factors are determined.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map (Exhibit 3), for the City of Tulsa is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by FEMA.

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 1							
Arkansas River							
Reach 1	0025,0030, 0035,0060, 0085,0100	-5.2	-4.1	+11.6	050	A10	Varies
Shallow Flooding Sheet Flow	0060	*	*	*	*	A0	Average Depth 3 feet
Watershed Unit 2							
Bird Creek							
Reach 1	0015,0020	-4.9	-1.5	+ 3.1	050	A10	Varies
Reach 2	0010,0015	-2.9	-1.5	+ 2.5	030	A6	Varies
Watershed Unit 7							
Bird Creek Tributary							
Reach 1	0015	-2.3	-0.9	+ 1.5	025	A5	Varies

*Not computed for shallow flooding

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

ARKANSAS RIVER-SHALLOW FLOODING
BIRD CREEK-BIRD CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 7 (continued)							
Coal Creek (North Tulsa)							
Reach 1	0015	-1.3	-0.4	+ 0.5	015	A3	Varies
Reach 2	0015,0040	-3.1	-1.0	+ 1.6	030	A6	Varies
Reach 3	0040	-5.9	-1.6	+ 2.0	060	A12	Varies
Reach 4	0040	-2.1	-0.6	+ 1.1	020	A4	Varies
Coal Creek Tributary							
Reach 1	0040	-1.9	-0.7	+ 1.1	020	A4	Varies
Flat Rock Creek							
Reach 1	0010,0015	-7.5	-1.3	+ 2.2	075	A15	Varies
Reach 2	0010	-3.0	-1.7	+ 3.2	030	A6	Varies
Reach 3	0010	-4.6	-1.0	+ 2.4	045	A9	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

COAL CREEK (NORTH TULSA)-COAL CREEK TRIBUTARY-FLAT ROCK CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 7 (continued)							
Flat Rock Creek Tributary A							
Reach 1	0010	-6.2	-1.1	+ 2.7	060	A12	Varies
Reach 2	0010	-2.9	-0.9	+ 3.5	030	A6	Varies
Dirty Butter Creek							
Reach 1	0010,0035	-2.3	-0.7	+ 1.7	025	A5	Varies
Shallow Flooding							
Sheet Flow	0035	*	*	*	*	AO	Average depth 2 feet
Dirty Butter Creek Tributary							
Reach 1	0010	-2.9	-0.7	+ 1.9	030	A6	Varies
Reach 2	0010	-6.6	-1.0	+ 2.0	065	A13	Varies
Reach 3	0010	-2.9	-0.8	+ 1.2	030	A6	Varies
Shallow Flooding							
Sheet Flow	0010,0035	*	*	*	*	AO	Average depth 2 feet

*Not computed for shallow flooding

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

FLAT ROCK CREEK TRIBUTARY A-DIRTY BUTTER CREEK-DIRTY BUTTER CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 7 (continued)							
Valley View Creek							
Reach 1	0010	-3.7	-1.2	+ 2.3	035	A7	Varies
Reach 2	0010	-3.0	-2.1	+ 7.3	030	A6	Varies
Watershed Unit 8							
Mingo Creek							
Reach 1	0020	-4.9	-1.0	+ 2.9	050	A10	Varies
Reach 2	0020,0040, 0045	-6.7	-1.4	+ 3.2	065	A13	Varies
Reach 3	0040,0045, 0065,0070	-3.2	-0.8	+ 1.7	030	A6	Varies
Reach 4	0070	-5.3	-1.6	+ 2.3	055	A11	Varies
Reach 5	0070	-3.0	-1.0	+ 1.6	030	A6	Varies
Reach 6	0065,0070	-1.5	-0.4	+ 0.9	015	A3	Varies
Douglas Creek							
Reach 1	0040,0045	-1.5	-0.4	+ 1.3	015	A3	Varies
Reach 2	0040,0045	-2.0	-0.4	+ 1.1	020	A4	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

VALLEY VIEW CREEK-MINGO CREEK-DOUGLAS CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Mill Creek							
Reach 1	0040	-2.3	-0.6	+ 1.2	025	A5	Varies
Jones Creek							
Reach 1	0040	-2.0	-0.5	+ 1.1	020	A4	Varies
Audubon Creek							
Reach 1	0040,0065	-2.7	-0.6	+ 1.4	025	A5	Varies
Bell Creek							
Reach 1	0065,0070	-3.4	-0.9	+ 1.7	035	A7	Varies
Reach 2	0065	-1.0	-0.4	+ 1.2	010	A2	Varies
Bell Creek Tributary							
Reach 1	0065,0070	-1.3	-0.3	+ 0.7	015	A3	Varies
Reach 2	0065,0070	-2.4	-0.6	+ 0.9	025	A5	Varies

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

MILL CREEK-JONES CREEK-AUDUBON CREEK-
BELL CREEK-BELL CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Fulton Creek							
Reach 1	0065,0070	-2.2	-0.5	+ 1.2	020	A4	Varies
Alsuma Creek							
Reach 1	0070	-0.7	-0.2	+ 0.7	005	A1	Varies
Reach 2	0070	-1.9	-0.2	+ 0.5	020	A4	Varies
Little Creek							
Reach 1	0020	-2.0	-0.6	+ 2.0	020	A4	Varies
Reach 2	0020	-1.0	-0.3	+ 0.8	010	A2	Varies
Quarry Creek							
Reach 1	0020,0045	-1.3	-0.4	+ 0.9	015	A3	Varies
Eagle Creek							
Reach 1	0020,0045	-0.8	-0.3	+ 1.2	010	A2	Varies
Reach 2	0045	-7.4	-2.1	+ 0.7	075	A15	Varies
Reach 3	0045	-3.4	-1.7	+ 0.7	035	A7	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

FULTON CREEK ALSUMA CREEK LITTLE CREEK-QUARRY CREEK-EAGLE CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Eagle Creek (continued)							
Reach 4	0045	-1.2	-0.4	+ 0.7	010	A2	Varies
Reach 5	0045	-1.3	-0.3	+ 0.6	015	A3	Varies
Cooley Creek							
Reach 1	0045	-3.6	-1.2	+ 2.1	035	A7	Varies
Reach 2	0045	-4.4	-2.4	+ 2.3	045	A9	Varies
Reach 3	0045	-2.2	-0.6	+ 1.5	020	A4	Varies
Reach 4	0045	-6.1	-2.9	+ 3.9	060	A12	Varies
Reach 5	0045	-1.3	-0.4	+ 0.7	015	A3	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

EAGLE CREEK-COOLEY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Cooley Creek Tributary							
Reach 1	0045	-2.1	-0.6	+ 1.2	020	A4	Varies
Reach 2	0045	-3.3	-1.3	+ 3.0	035	A7	Varies
Reach 3	0045,0050	-1.3	-0.4	+ 1.0	015	A3	Varies
Reach 4	0050	-2.0	-0.5	+ 1.5	020	A4	Varies
Tupelo Creek							
Reach 1	0045	-2.2	-0.6	+ 1.2	020	A4	Varies
Tupelo Creek Tributary							
Reach 1	0045	-1.1	-0.3	+ 0.9	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

COOLEY CREEK TRIBUTARY - TUPELO CREEK - TUPELO CREEK TRIBUTARY

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Brookhollow Creek							
Reach 1	0070	-2.9	-0.7	+ 1.5	030	A6	Varies
Reach 2	0045,0070	-2.0	-0.5	+ 1.1	020	A4	Varies
Brookhollow Creek Tributary							
Reach 1	0070	-2.9	-0.6	+ 1.2	030	A6	Varies
Reach 2	0070	-1.5	-0.3	+ 0.8	015	A3	Varies
Sugar Creek							
Reach 1	0070	-3.9	-1.0	+ 2.3	040	A8	Varies
Reach 2	0070	-1.3	-0.3	+ 0.8	015	A3	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

BROOKHOLLOW CREEK - BROOKHOLLOW CREEK TRIBUTARY - SUGAR CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 8 (continued)							
Southpark Creek							
Reach 1	0070	-4.7	-2.0	+ 1.3	045	A9	Varies
Reach 2	0070	-1.0	-0.3	+ 0.7	010	A2	Varies
Ford Creek							
Reach 1	0070	-1.4	-0.5	+ 1.3	015	A3	Varies
Reach 2	0070	-2.2	-0.5	+ 0.8	020	A4	Varies
Reach 3	0070	-1.5	-0.4	+ 0.9	015	A3	Varies
Catfish Creek							
Reach 1	0070	-2.2	-0.6	+ 1.2	020	A4	Varies
Reach 2	0070	-0.9	-0.2	+ 0.6	010	A2	Varies
Watershed Unit 9							
Spunky Creek Tributary A							
Reach 1	0050	-1.2	-0.5	+ 0.6	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

SOUTHPARK CREEK-FORD CREEK-CATFISH CREEK-SPUNKY CREEK TRIBUTARY A

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 9 (continued)							
Spunky Creek Tributary B							
Reach 1	0050	-4.1	-0.6	+ 0.9	040	A8	Varies
Reach 2	0050	-1.5	-0.2	+ 0.5	015	A3	Varies
Spunky Creek Tributary B-1							
Reach 1	0050	-1.0	-0.1	+ 0.3	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

SPUNKY CREEK TRIBUTARY B-SPUNKY CREEK TRIBUTARY B-1

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 10							
Harlow Creek							
Reach 1	0030	-8.5	-2.6	+0.4	085	A17	Varies
Reach 2	0030	-6.5	-3.2	+1.6	065	A13	Varies
Reach 3	0030	-2.8	-2.9	+2.7	030	A6	Varies
Harlow Creek Tributary							
Reach 1	0025,0030	-2.5	-1.2	+1.6	025	A5	Varies
Blackboy Creek							
Reach 1	0025	-12.9	-3.1	+1.0	130	A23	Varies
Reach 2	*	-7.1	-3.0	+1.2	070	A14	Varies
Reach 3	0025	-4.2	-2.4	+1.6	040	A8	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

*Located outside corporate limits.

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

HARLOW CREEK - HARLOW CREEK TRIBUTARY-BLACKBOY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 11 Vensel Creek							
Reach 1	0085	-1.7	-0.5	+ 2.5	015	A3	Varies
Reach 2	0085	-0.9	-0.1	+ 0.5	010	A2	Varies
Reach 3	0085	-0.3	-0.1	+ 0.1	005	A1	Varies
Reach 4	0085,0090	-2.1	-0.4	+ 0.3	020	A4	Varies
Reach 5	0090	-1.5	-0.2	+ 0.4	015	A3	Varies
Reach 6	0090	-3.6	-0.5	+ 1.1	035	A7	Varies
Reach 7	0090	-2.0	-0.4	+ 0.5	020	A4	Varies
Shallow Over-land Flooding	0085	*	*	*	*	A0	Average depth 3 feet
Fred Creek Reach 1	0085,0090	-2.8	-0.8	+ 1.2	030	A6	Varies
Joe Creek Reach 1	0060,0085	-5.1	-1.5	+ 5.8	050	A10	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

*Not computed for shallow flooding

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

VENSEL CREEK-FRED CREEK-JOE CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 11 (continued)							
South Fork Joe Creek							
Reach 1	0060,0065	-2.7	-0.6	+ 1.4	025	A5	Varies
Little Joe Creek							
Reach 1	0060,0065	-3.8	-0.8	+ 2.0	040	A8	Varies
Reach 2	0065	-1.2	-0.3	+ 0.8	010	A2	Varies
Reach 3	0065	-5.0	-1.3	+ 1.7	050	A10	Varies
South Fork Little Joe Creek							
Reach 1	0065	-3.9	-0.8	+ 1.5	040	A8	Varies
Reach 2	0065	-2.0	-0.6	+ 1.4	020	A4	Varies
Reach 3	0065	-1.0	-0.3	+ 0.5	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

SOUTH FORK JOE CREEK- LITTLE JOE CREEK- SOUTH FORK LITTLE JOE CREEK

85

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 11 (continued)							
North Fork Little Joe Creek							
Reach 1	0065	-1.7	-4.0	+ 2.4	015	A3	Varies
Reach 2	0065	-5.5	-3.0	+ 2.5	055	A11	Varies
Reach 3	0065	-2.1	-2.2	+ 2.2	020	A4	Varies
Reach 4	0065	-0.9	-0.5	+ 1.0	010	A2	Varies
East Branch Joe Creek							
Reach 1	0060	-1.1	-0.6	+ 1.1	010	A2	Varies
Reach 2	0060,0065	-5.5	-0.9	+ 1.7	055	A11	Varies
Reach 3	0065	-2.7	-0.6	+ 1.2	025	A5	Varies
Reach 4	0065	-1.5	-0.8	+ 1.1	015	A3	Varies
West Branch Joe Creek							
Reach 1	0060	-4.4	-0.7	+ 1.3	045	A9	Varies
Reach 2	0060	-7.1	-0.9	+ 2.0	070	A14	Varies
Reach 3	0060	-5.0	-0.9	+ 1.9	050	A10	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

NORTH FORK LITTLE JOE CREEK-EAST BRANCH JOE CREEK-WEST BRANCH JOE CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 11 (continued)							
Crow Creek							
Reach 1	0060	-5.5	-1.5	+ 4.5	055	A11	Varies
Reach 2	0035,0060	-3.6	-1.0	+ 2.1	035	A7	Varies
Watershed Unit 12							
Hager Creek							
Reach 1	0085	-4.0	-1.4	+ 1.9	040	A8	Varies
Reach 2	0085	-1.0	-0.8	+ 0.8	010	A2	Varies
Reach 3	0085	-2.1	-0.7	+ 1.1	020	A4	Varies
Mooser Creek							
Reach 1	0055,0060	-4.6	-1.2	+ 4.1	045	A9	Varies
Reach 2	0055	-2.3	-0.7	+ 4.1	025	A5	Varies
Mooser Creek Tributary							
Reach 1	0055	-2.4	-0.6	+ 1.3	025	A5	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

CROW CREEK-HAGER CREEK-MOOSER CREEK-MOOSER CREEK TRIBUTARY

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 12 (continued)							
Cherry Creek (West Tulsa)							
Reach 1	0055,0060	-3.4	-1.4	+ 9.0	035	A7	Varies
Reach 2	0055,0060	-2.0	-1.0	+ 7.0	020	A4	Varies
Red Fork Creek							
Reach 1	0055	-7.1	-2.3	+ 7.4	070	A14	Varies
Reach 2	0055	-2.4	-0.9	+ 2.4	025	A5	Varies
Nickel Creek							
Reach 1	0080	-2.2	-0.6	+ 1.3	020	A4	Varies
Watershed Unit 13							
Haikey Creek							
Reach 1	0095	-3.2	-0.8	+ 1.7	030	A6	Varies
Reach 2	0070	-1.5	-0.3	+ 0.7	015	A3	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

CHERRY CREEK(WEST TULSA)-RED FORK CREEK-NICKEL CREEK-HAIKEY CREEK

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Watershed Unit 13 (continued) West Branch Haikey Creek							
Reach 1	0095	-2.2	-0.6	+ 1.2	020	A4	Varies
Little Haikey Creek							
Reach 1	0090,0095	-2.2	-0.7	+ 1.5	020	A4	Varies
Little Haikey Creek Tributary							
Reach 1	0090	-2.2	-0.5	+ 1.0	020	A4	Varies
Fry Ditch No. 2 Shallow Flooding							
Sheet Flow	0100	*	*	*	*	AO	Average depth 2 feet
Reach 1	0900	-2.7	-1.0	+ 1.6	025	A5	Varies

* Not computed for shallow flooding

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE AND ROGERS COS.)

FLOOD INSURANCE ZONE DATA

WEST BRANCH HAILEY CREEK - LITTLE HAIKEY CREEK - LITTLE HAIKEY CREEK TRIBUTARY - FRY DITCH NO.2

BEST DOCUMENT AVAILABLE

6.0 OTHER STUDIES

Detailed studies were made by the Corps of Engineers on Cherry and Red Fork Creeks in West Tulsa, for a report entitled "Detailed Project Report" (DPR) dated November 1960 (Reference 6). The studies investigated the feasiblity of providing flood protection for areas along the streams. The project is designed to protect against a flood equal to the flood of record of September 3, 1940. The September 1940 flood flow of 4,200 cfs (below the Red Fork Creek confluence) was estimated to be a 25-year flood in the DPR studies. However, 4,200 cfs is now estimated to be between a 10- and 50-year flow. Studies were made by the Corps of Engineers for a Detailed Project Report, dated November 1968 (Reference 7), for Flat Rock Creek and Valley View Creek. The report investigated possible flood control measures and showed a 100-year design channel to be economically feasible. The Flat Rock Creek 100-year flood flow of 11,600 cfs (at Peoria Avenue) in the DPR is about 25 percent below those shown in this Flood Insurance Study (FIS). This difference is attributed to more refined methods of determining the various flood flows, and because of updated hydrologic data.

In March 1970, the Corps of Engineers published a Flood Plain Information (FPI) report (Reference 8), for the main stem of Mingo Creek. The FPI report showed flows and backwater profiles for the 100-year flood and Standard Project Flood, and showed photographs of historic and possible future flooding. Mingo Creek discharges (100-year) presented in the FPI report are about 55 percent lower than those used in this FIS. The higher discharges, plus more detailed topographic and historic flood information, and an increase of urbanization in the basin from 1970 to 1979, results in the FIS 100-year profile being an average of about 3 feet higher than the FPI 100-year profile.

The Corps of Engineers published a Special Flood Hazard Information report for Tulsa in October 1970 (Reference 9) that showed the 100-year and Standard Project Flood water-surface profiles for nine (9) streams. Those streams are the Arkansas River, Joe, Little Joe, South Fork Little Joe, Mingo, Flat Rock, Valley View, Cherry and Red Fork Creeks.

In June 1971, the Corps of Engineers prepared the Tulsa, Oklahoma, Type 10 Flood Insurance Study (FIS) under an interagency agreement with the Federal Insurance Administration (FIA), Department of HUD (Reference 10). Profiles and flooding information were developed for the Arkansas River, Bird, Flat Rock, Valley View, Mingo, Joe, Little Joe, South Fork of Little Joe, Cherry, and Red Fork Creeks. The flooding information developed in the 1971 FIS was based on limited survey data, 10-foot contour interval topographic maps, and limited hydrologic and hydraulic data. Because of the more detailed 2-foot contour interval topo data, increases in urbanization, and more detailed hydrologic data, this FIS supercedes the June 1971 FIS.

A Flood Plain Information (FPI) report for Haikey Creek and tributaries was published by the Corps of Engineers in September 1973 (Reference 11). The FPI report presented the 100-year and Standard Project Floods profiles and also showed the approximate limits of the flood boundaries. The 100-year discharges computed for the flood insurance study on Haikey Creek and its tributaries average about 1 to 3 feet higher at most points than those computed for the FPI. The major reason for that increase is the increased amount of urbanization that has occurred in the watershed. Also, better topographic data was available for the FIS, which resulted in a more detailed hydrologic model of the basin.

The difference in 100-year flood elevations shown in the FIS and those shown in the FPI at various points on Haikey Creek and its tributaries can be attributed to the differences in discharges discussed above and to the development of detailed topographic data. The detailed topographic data allowed the addition of cross sections at numerous points to increase the accuracy of the backwater computations. Also, channel realignment in several stream reaches has changed flood elevations.

An Interim Special Flood Hazard Information report was published by the Corps of Engineers in April 1977 for Bird Creek from the mouth to Sperry, Oklahoma, (Reference 12). The flooding information was developed to provide guidance for flood plain management on Bird Creek until the Tulsa FIS was completed.

The Corps of Engineers published a report on the May 30, 1976, flood for the Tulsa area in December 1977 (Reference 13). The report presented high water profiles and photographs for many streams in the Tulsa area. Flooded area maps were included in the report. The streams included Mingo, Joe, Little Joe, Fred, and Haikey Creeks and Fry Ditch No. 2.

The Corps of Engineers has prepared preliminary reports for the Tulsa Metropolitan Area Urban Study, dated January 1979 (Reference 14), for the watersheds studied in the FIS. The reports were prepared to develop plans which, if implemented, could be used to help solve the urban problems associated with water and related land resources.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Federal Center, Denton, Texas 76201.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Army Corps of Engineers, Tulsa District; "Tulsa Metro Area Photogrammetric and Cross Section Survey", March 1977.

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8. U.S. Army Corps of Engineers, Tulsa District, "Flood Plain Information Report, Mingo Creek, Tulsa, Oklahoma", March 1970.

9. U.S. Army Corps of Engineers, Tulsa District, "Special Flood Hazard Information, Tulsa, Oklahoma", October 1970.

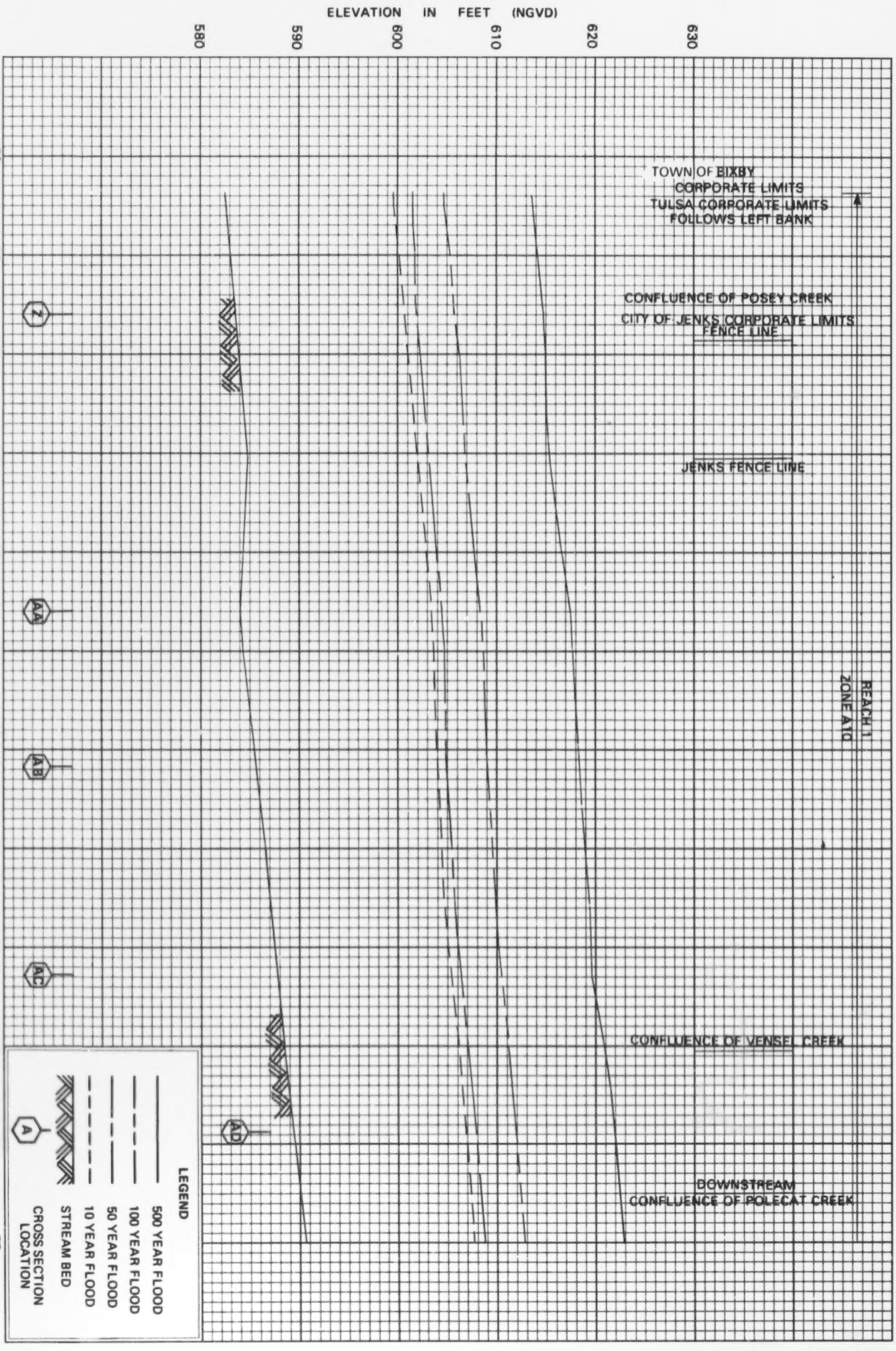
10. U.S. Army Corps of Engineers, Tulsa District, "Flood Insurance Study, Tulsa, Oklahoma", June 1971.

11. U.S. Army Corps of Engineers, Tulsa District, "Flood Plain Information, Haikey Creek, Tulsa County, Oklahoma", September 1973.

12. U.S. Army Corps of Engineers, Tulsa District, "Interim Special Flood Hazard Information, Bird Creek (Mouth to Sperry), Tulsa, Oklahoma", April 1970.

13. U.S. Army Corps of Engineers, Tulsa District, "Report on Flood of May 30, 1976 - Tulsa, Oklahoma, and Vicinity", December 1977.

14. U.S. Army Corps of Engineers, Tulsa District, "Tulsa Metropolitan Area, Tulsa Urban Study, Draft Summary Report, Stage II Study", January 1979.



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

ARKANSAS RIVER

01P

93

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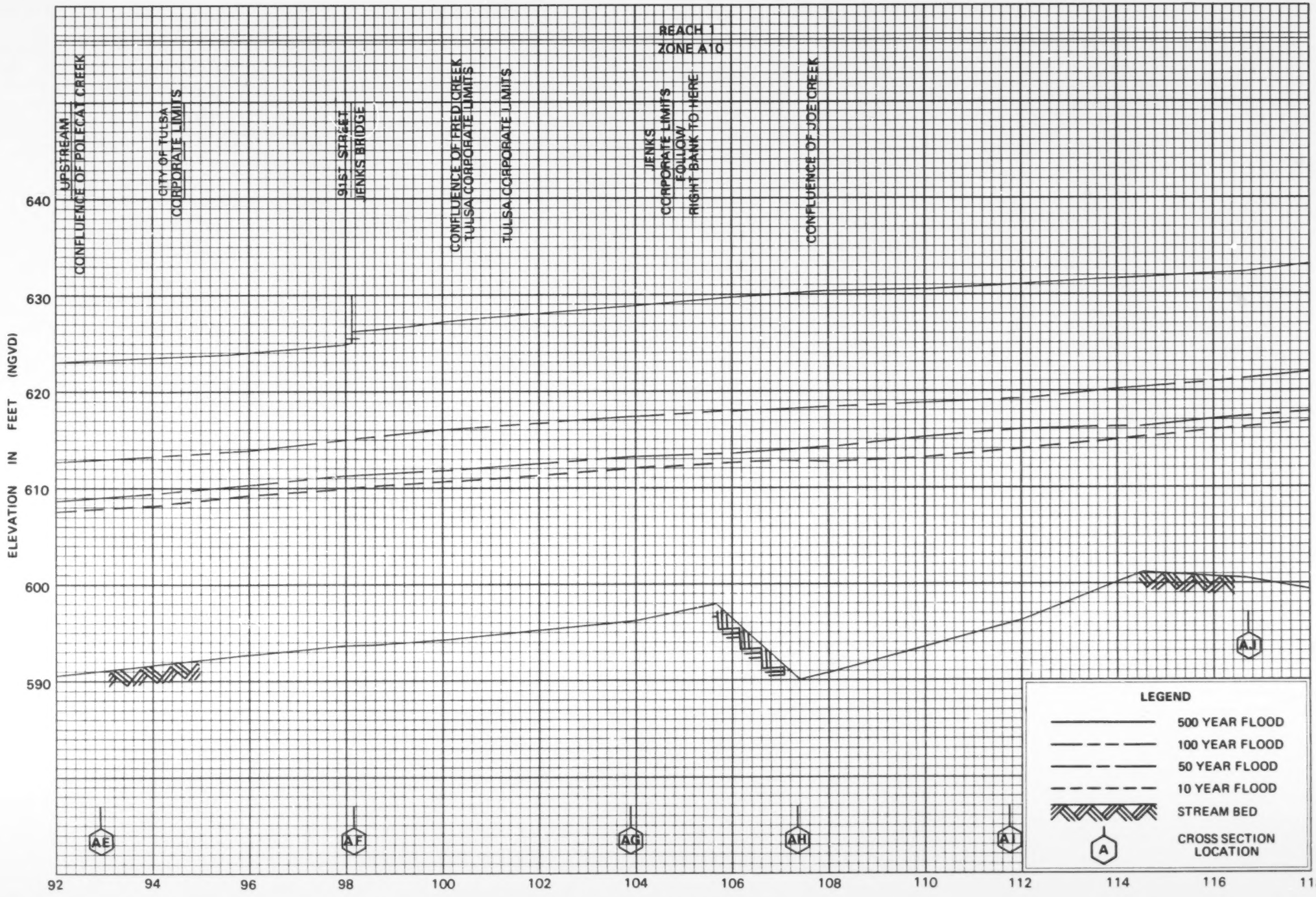

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

02P

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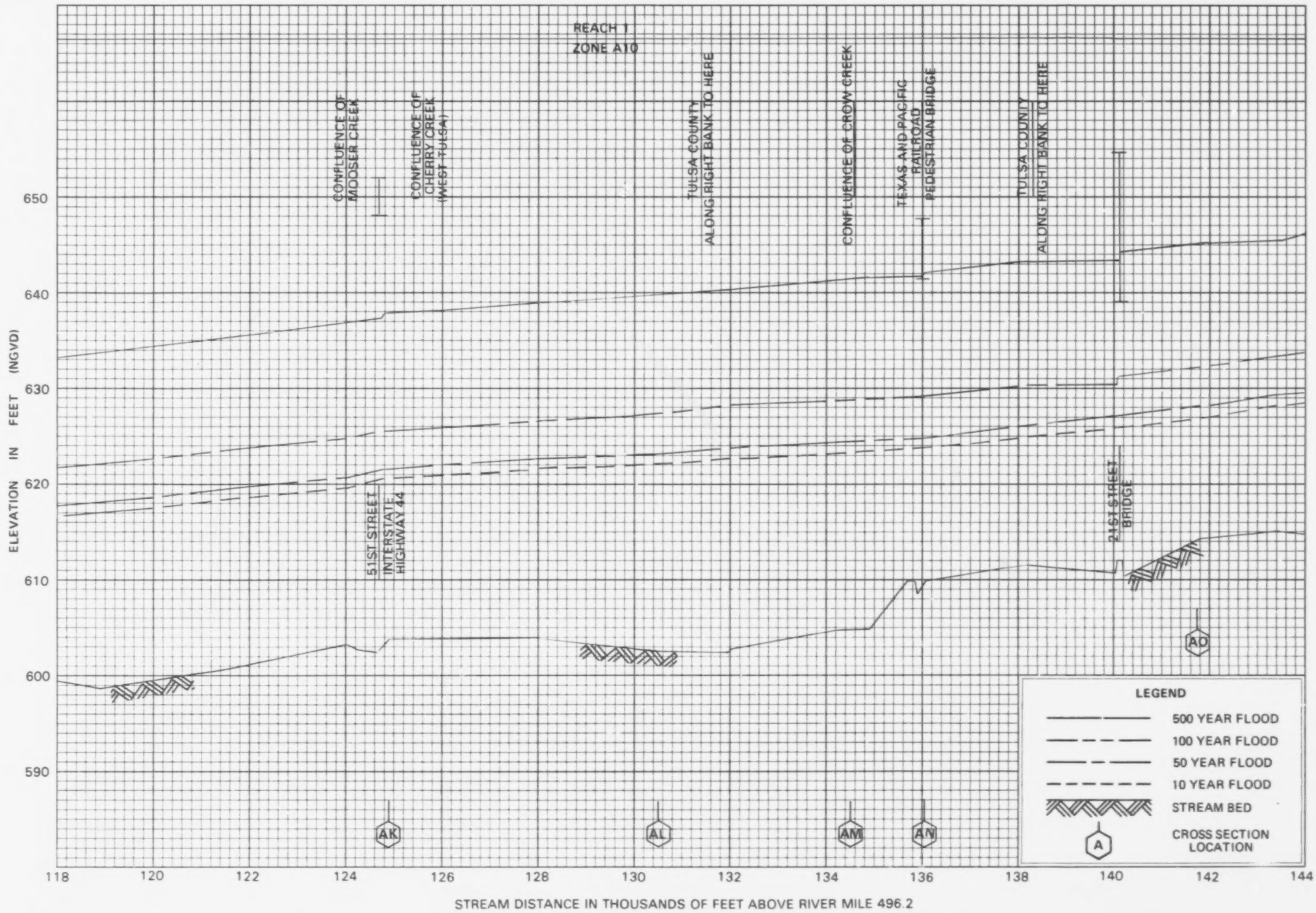

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

03P

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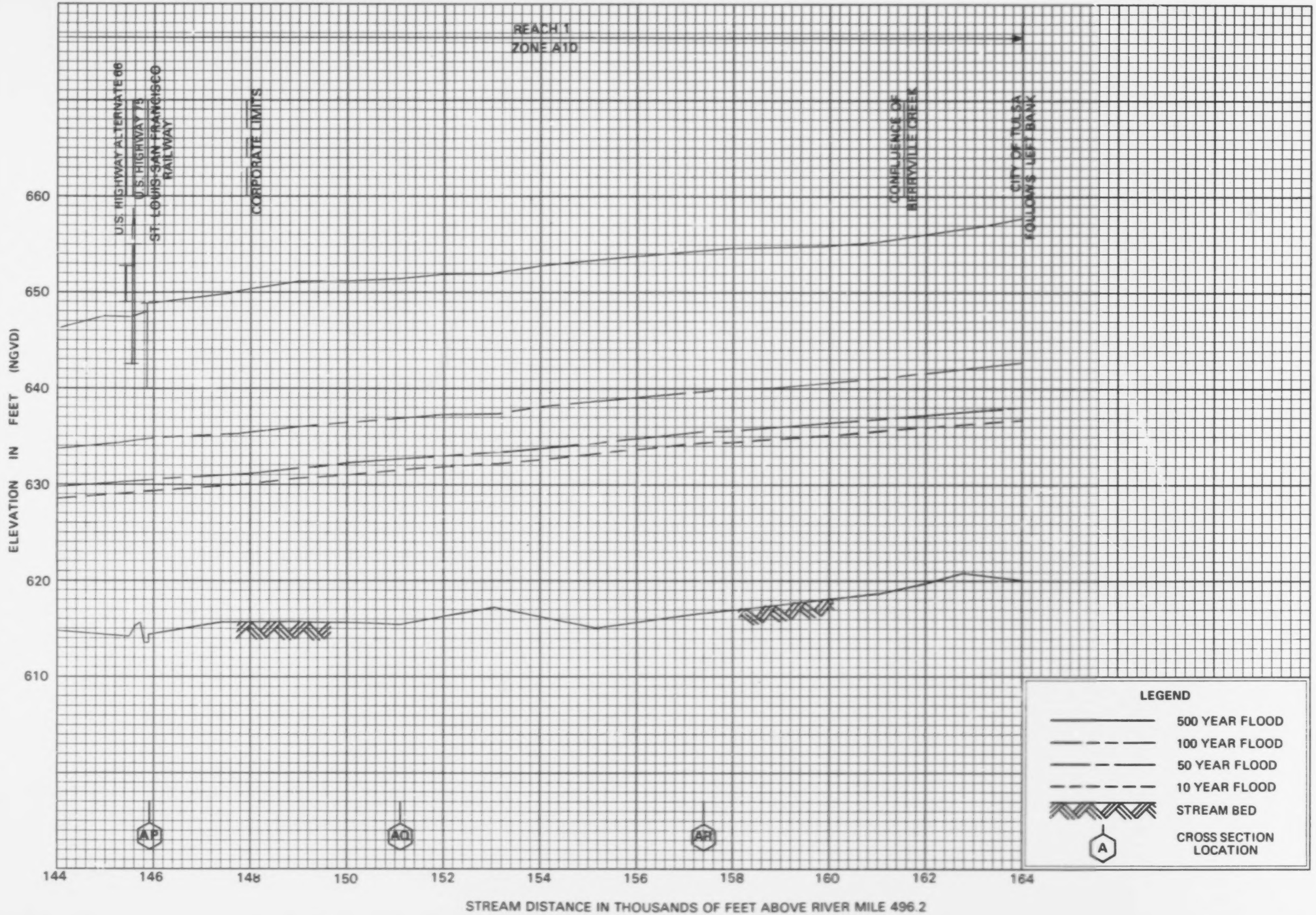

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

04P

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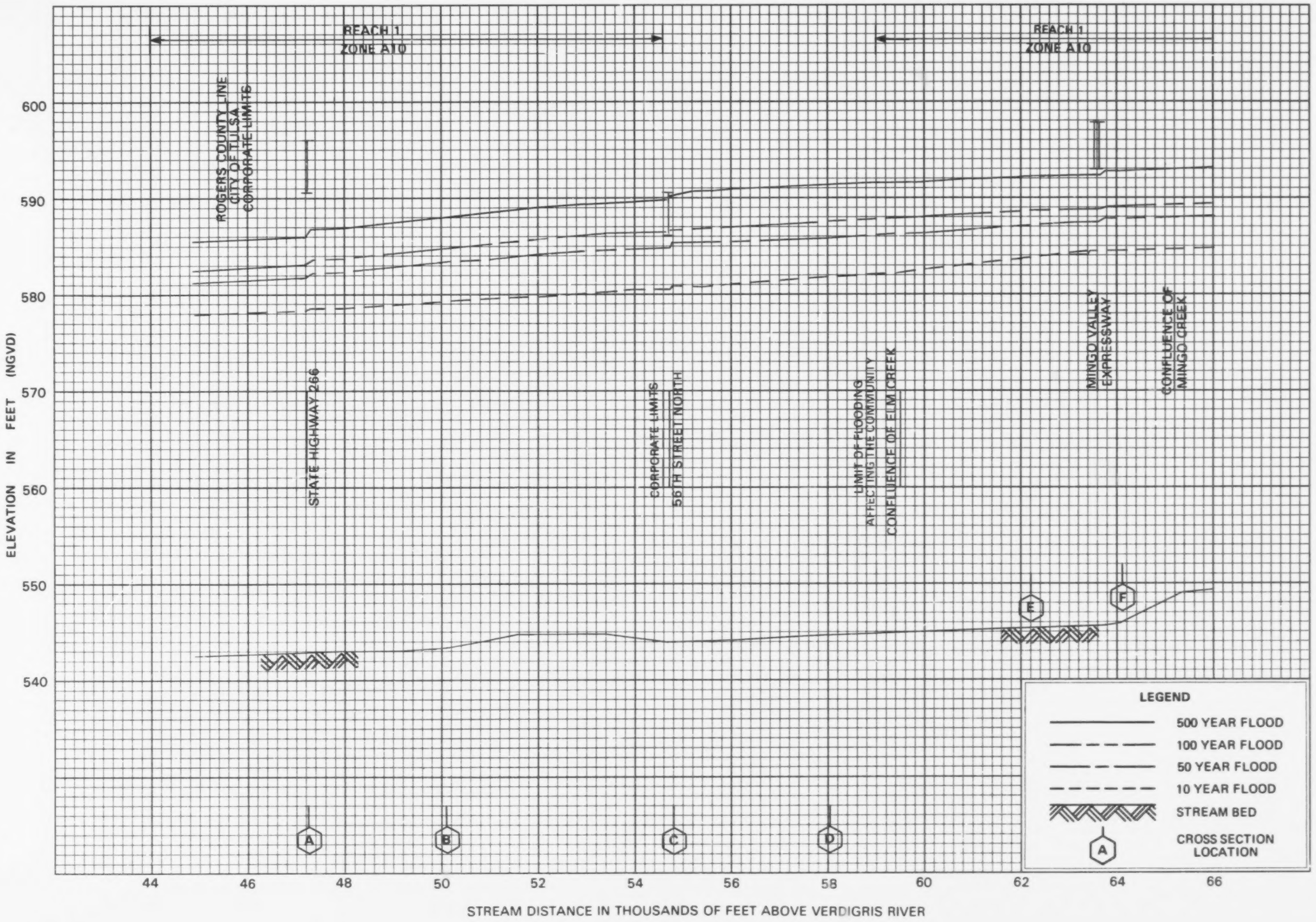

FLOOD PROFILES

BIRD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

05P

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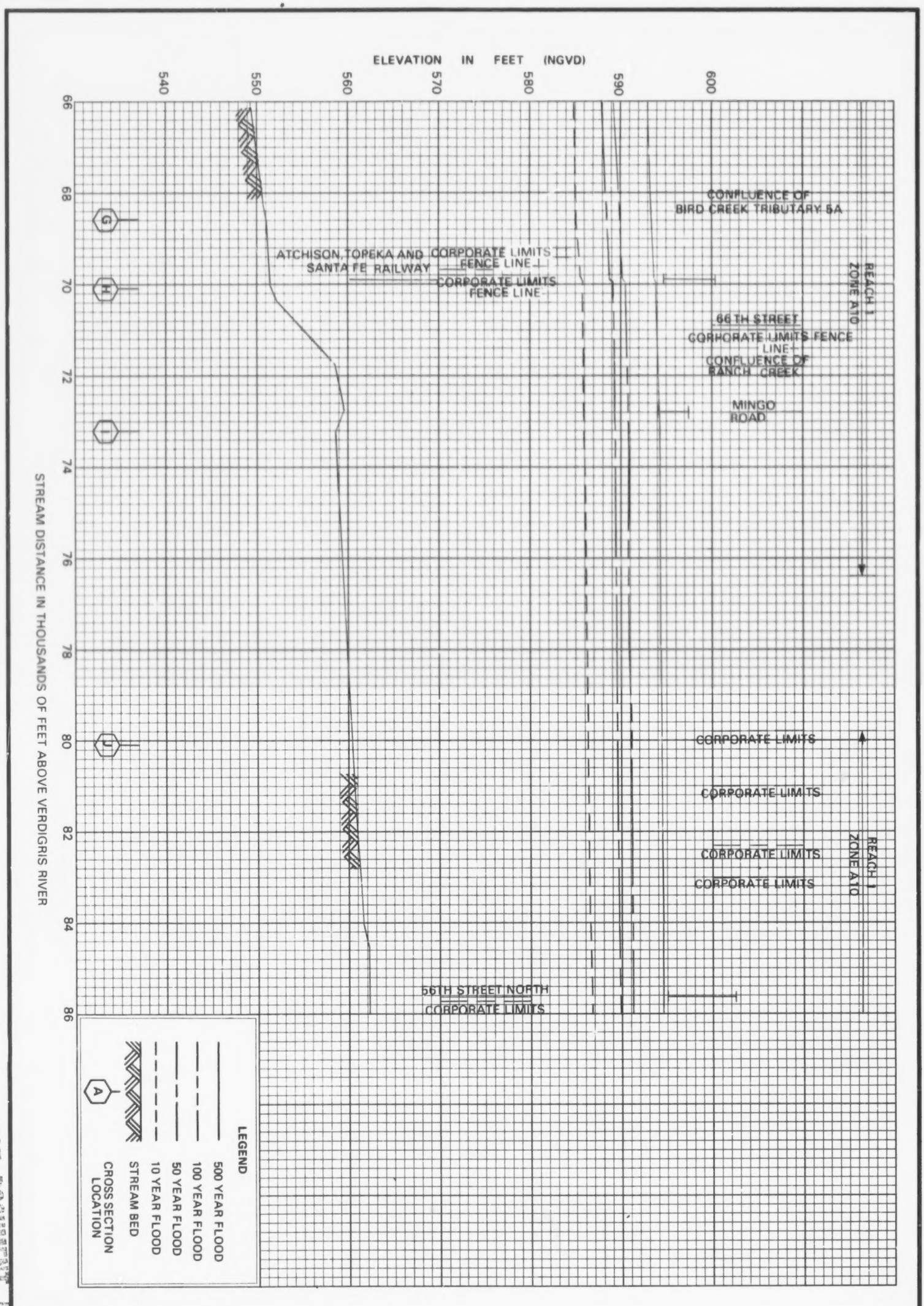


FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

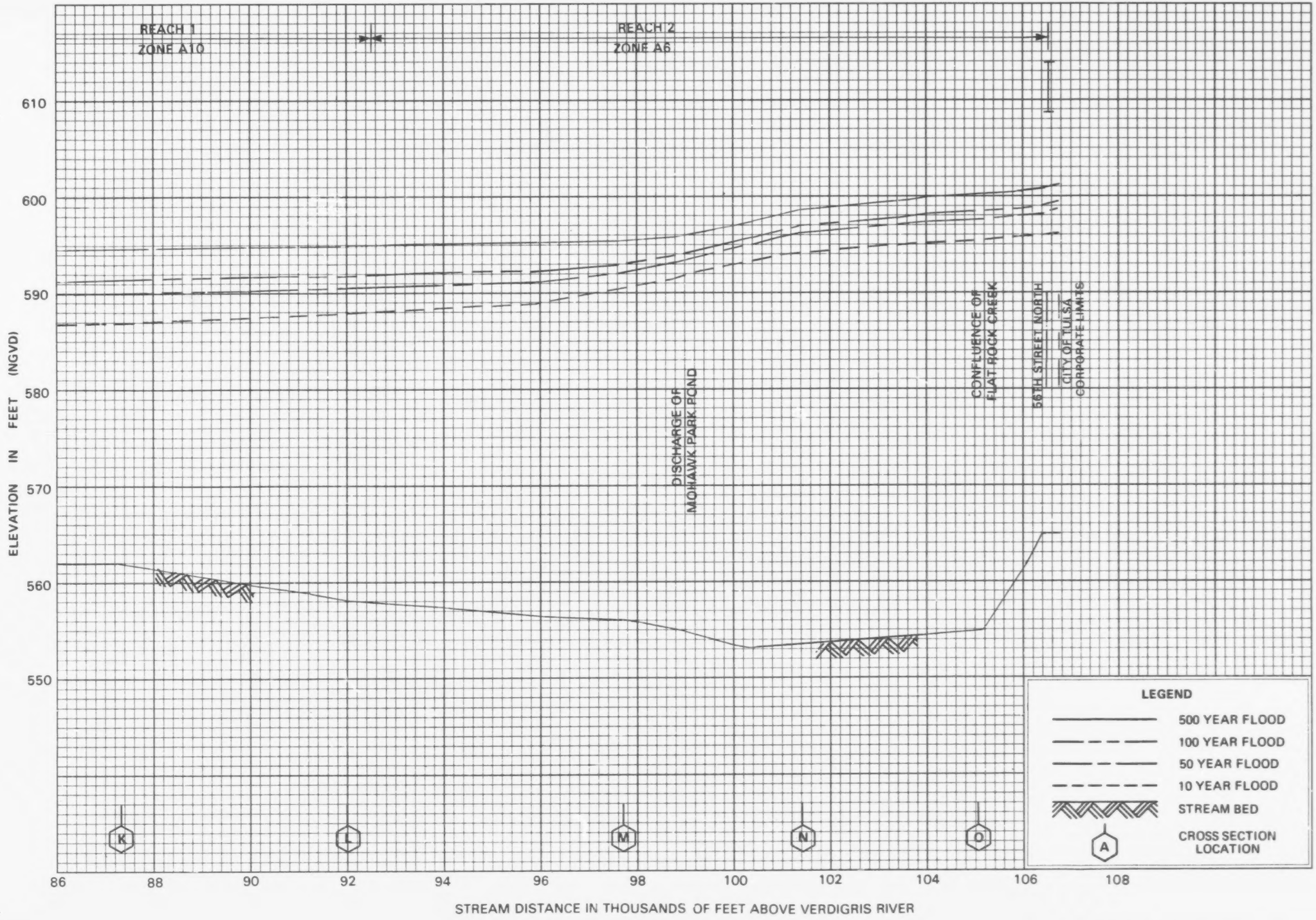
FLOOD PROFILES

BIRD CREEK

06P

99

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

BIRD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

07P

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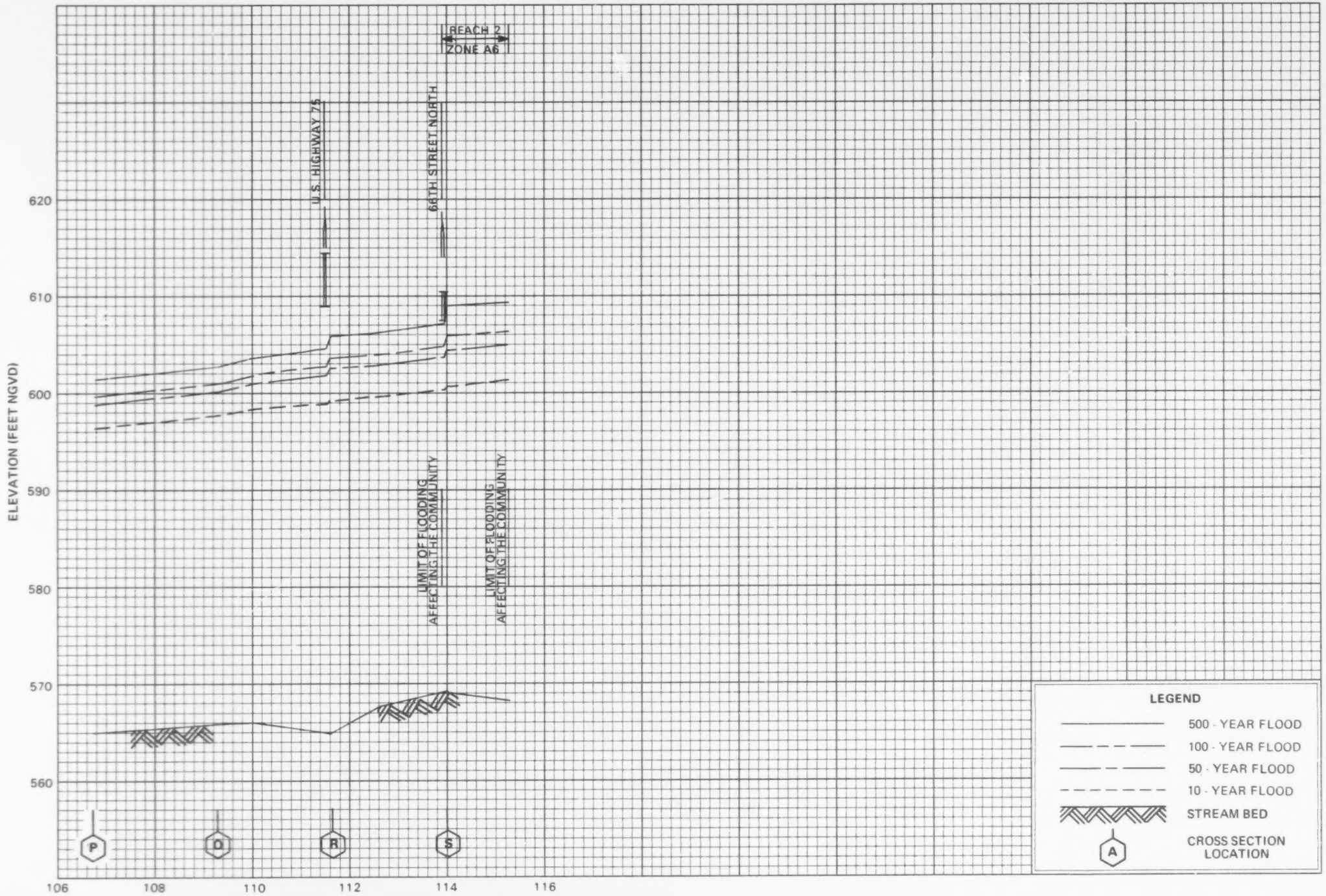

FLOOD PROFILES

BIRD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

08P

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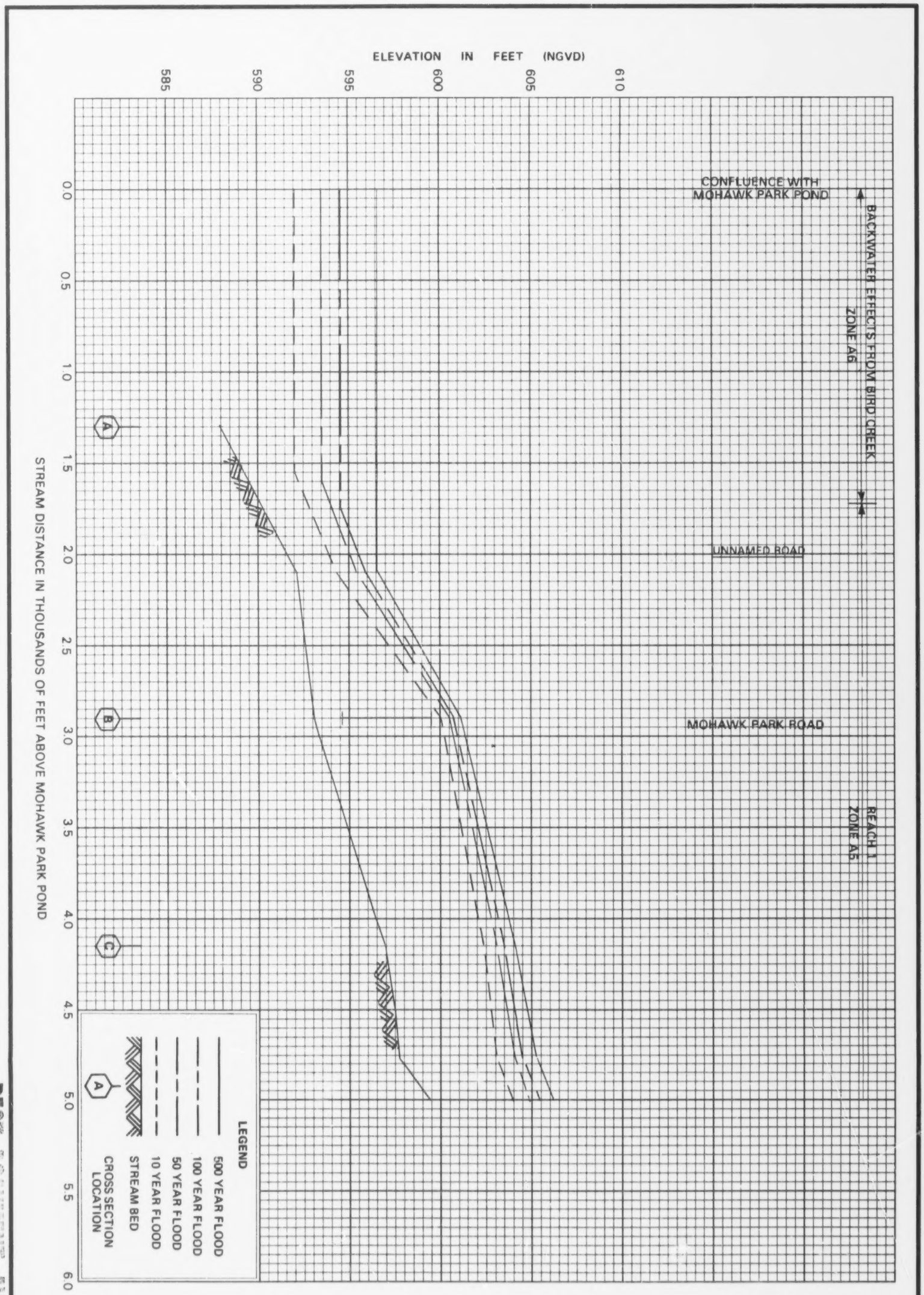

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

BIRD CREEK TRIBUTARY

09P

101

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REACH 1
ZONE A5

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NGVD)

615
610
605
600
595

D
E

5.0
5.5
6.0
6.5
7.0

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE MOHAWK PARK POND

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

BIRD CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

10P

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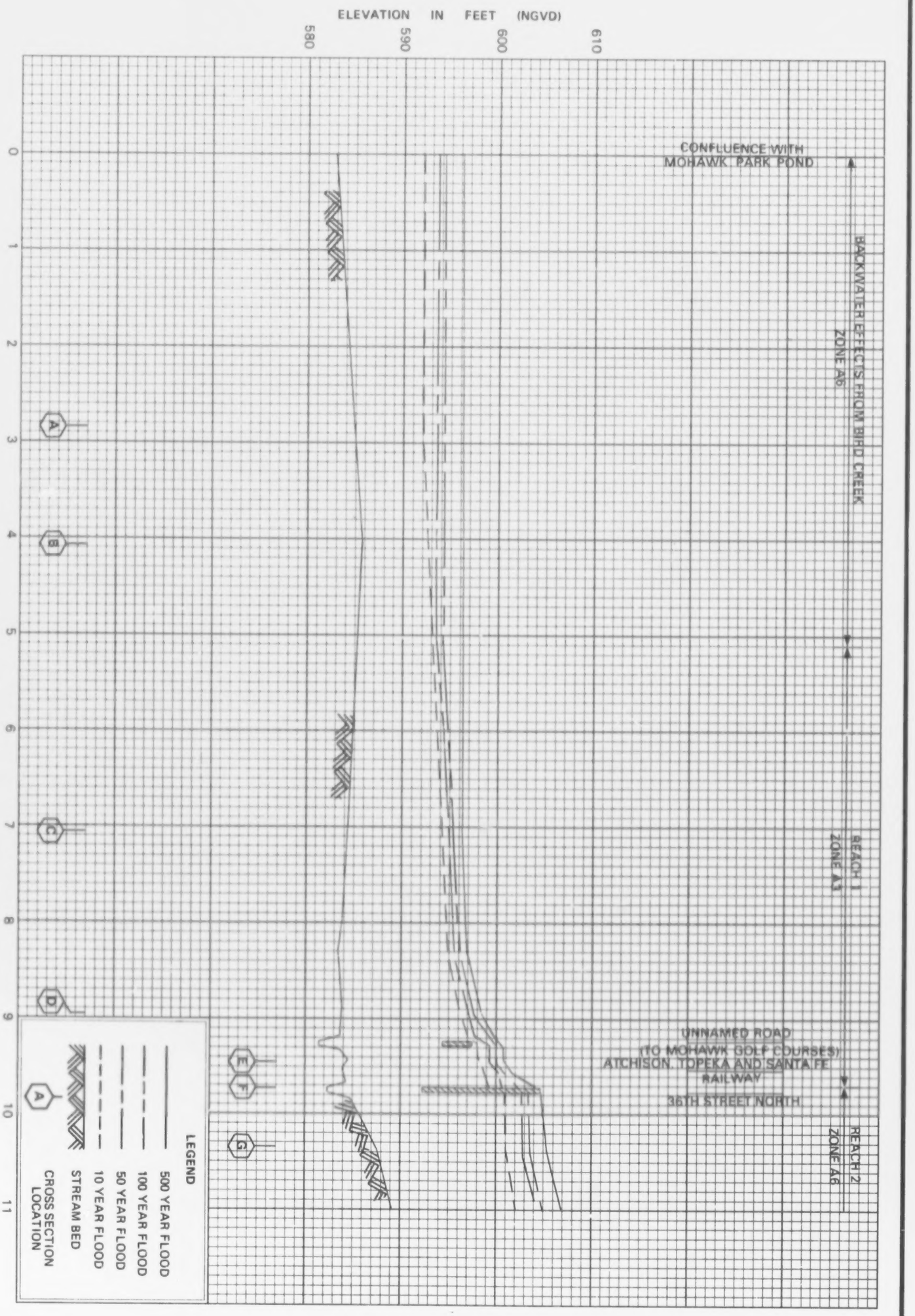

11P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF TULSA, OK** (TULSA, OSAGE, AND ROGERS COS.)	**FLOOD PROFILES** **COAL CREEK (NORTH TULSA)**

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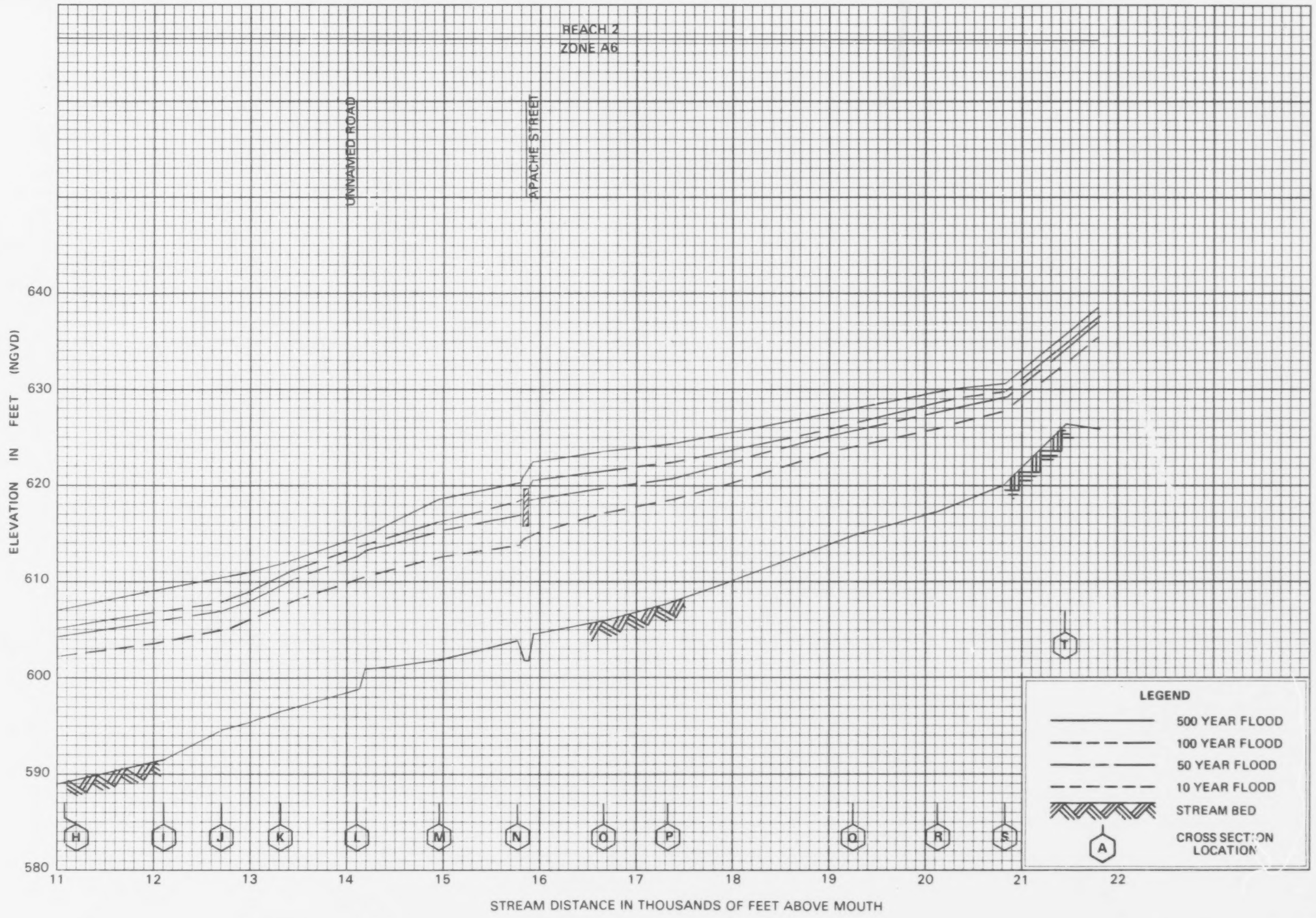

FLOOD PROFILES

COAL CREEK (NORTH TULSA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

12P

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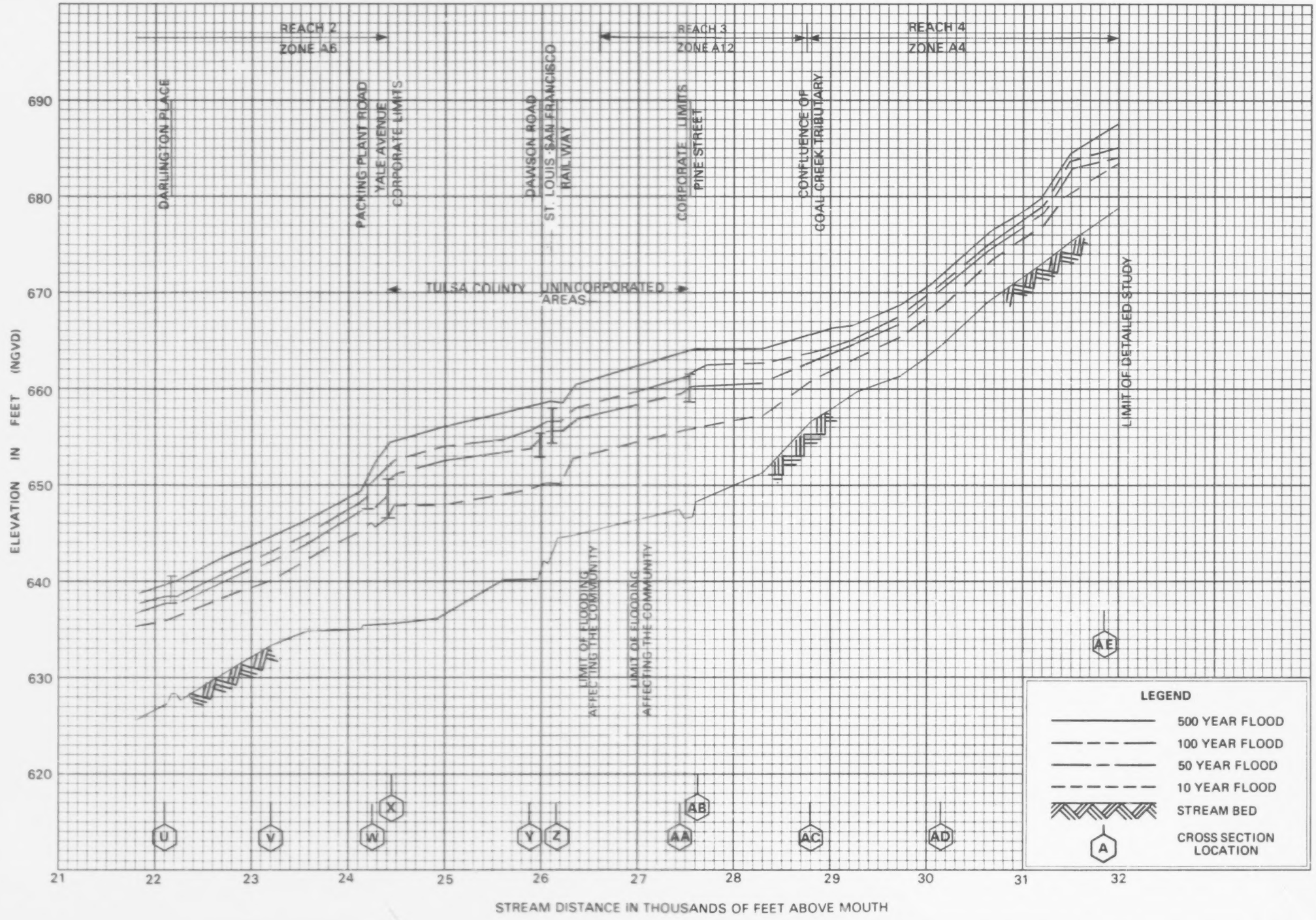

FLOOD PROFILES

COAL CREEK (NORTH TULSA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

13P

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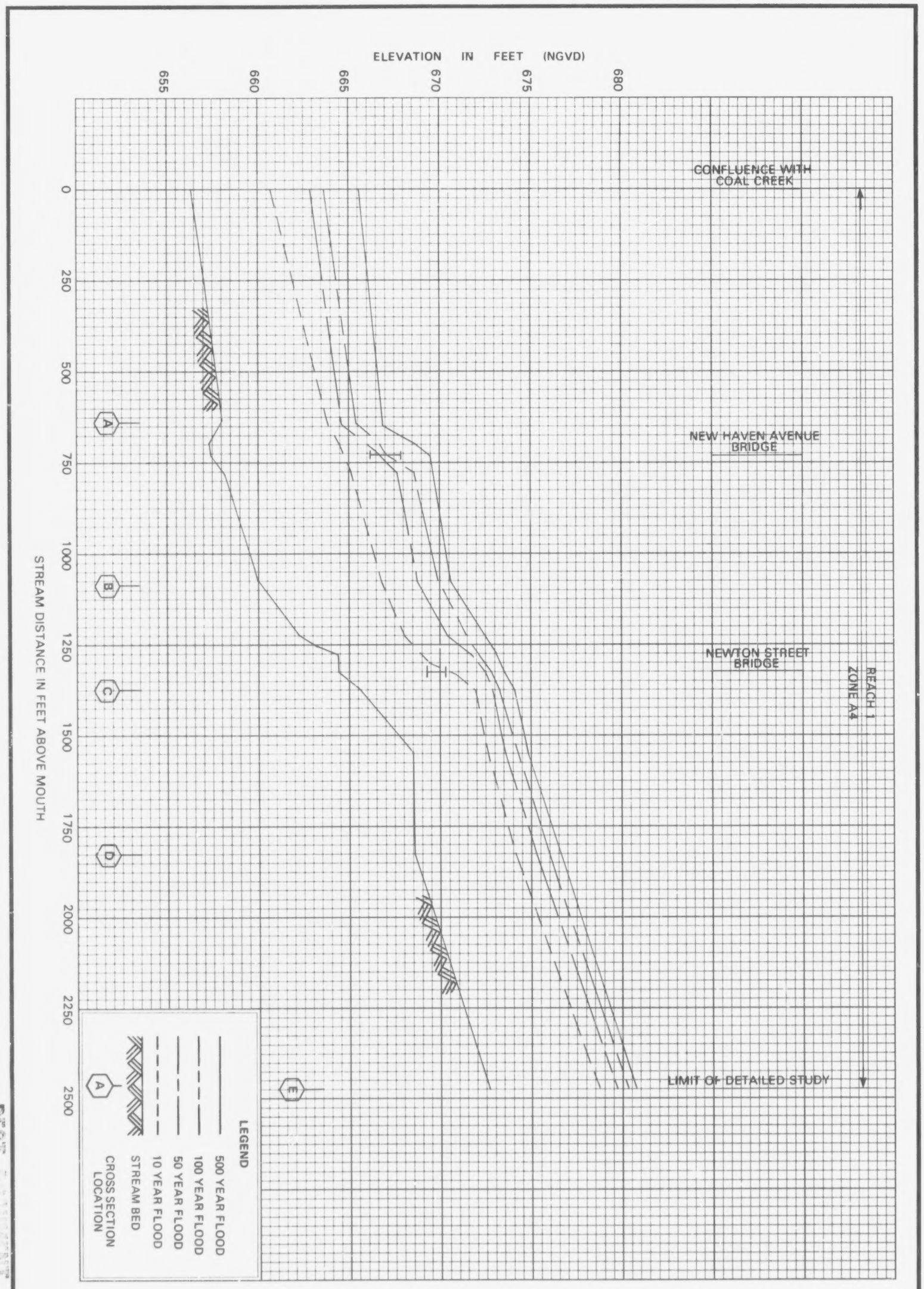

14P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF TULSA, OK (TULSA, OSAGE, AND ROGERS COS.)	FLOOD PROFILES COAL CREEK TRIBUTARY

106

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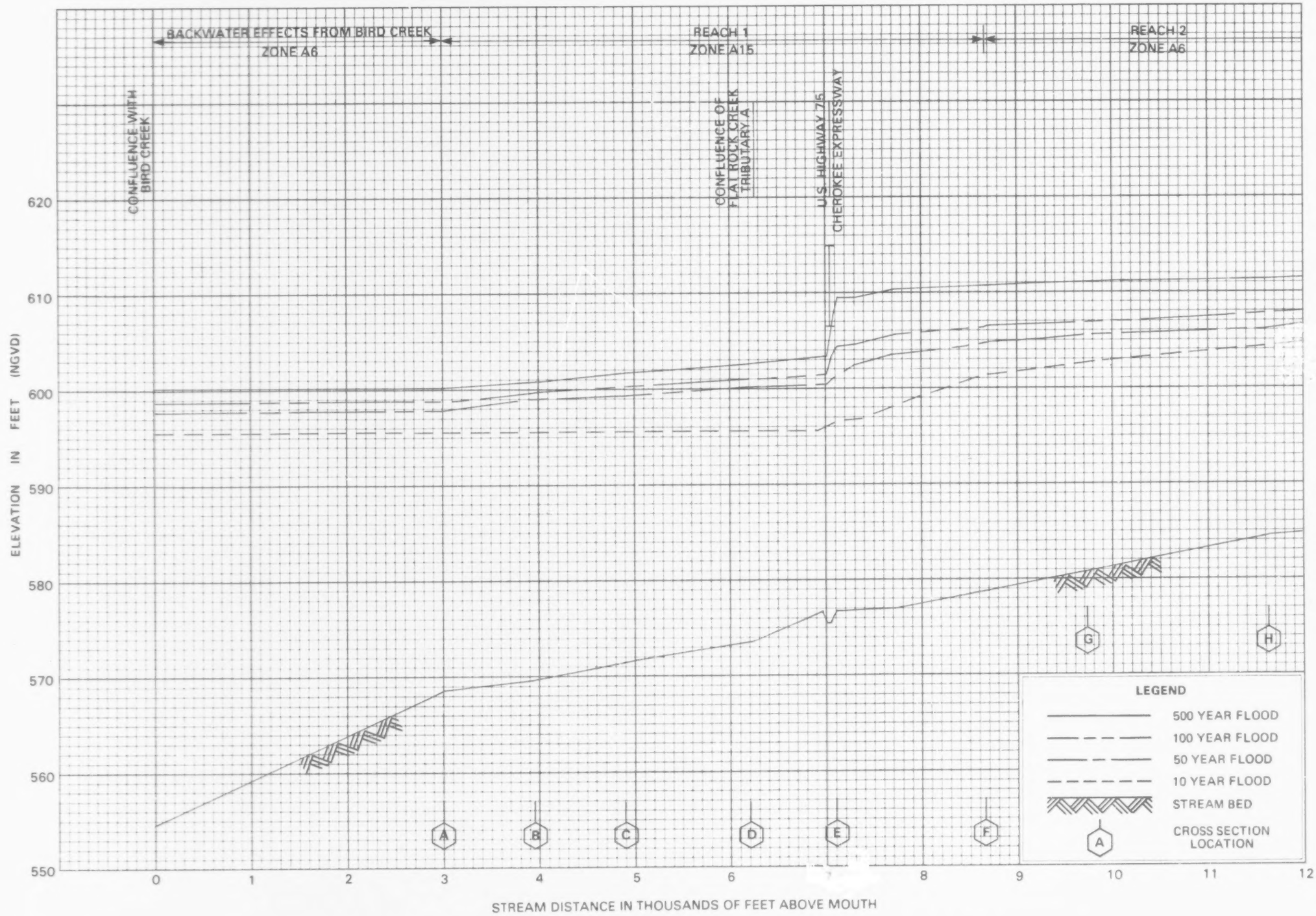

FLOOD PROFILES

FLAT ROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

15P

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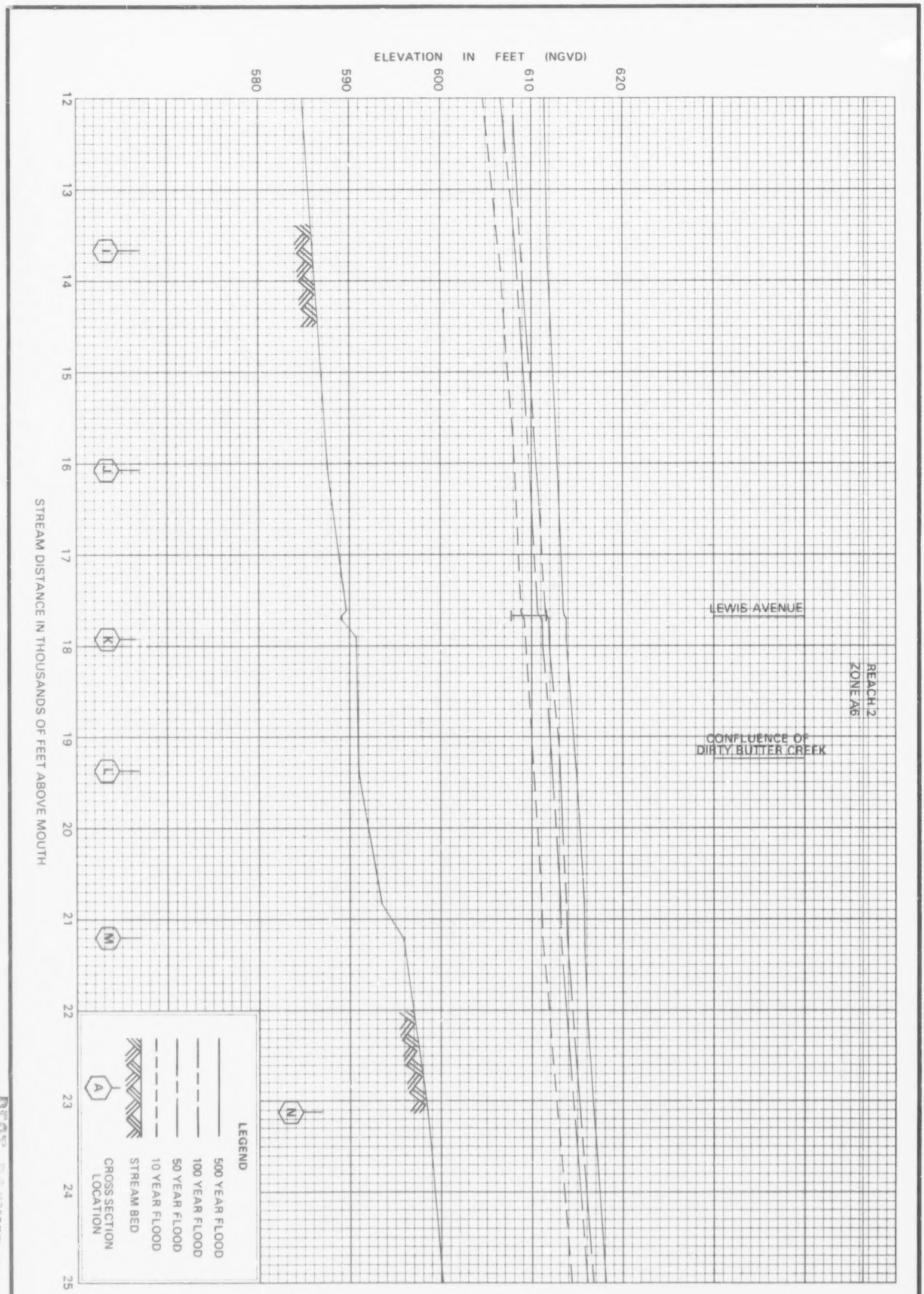

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

FLAT ROCK CREEK

16P

108

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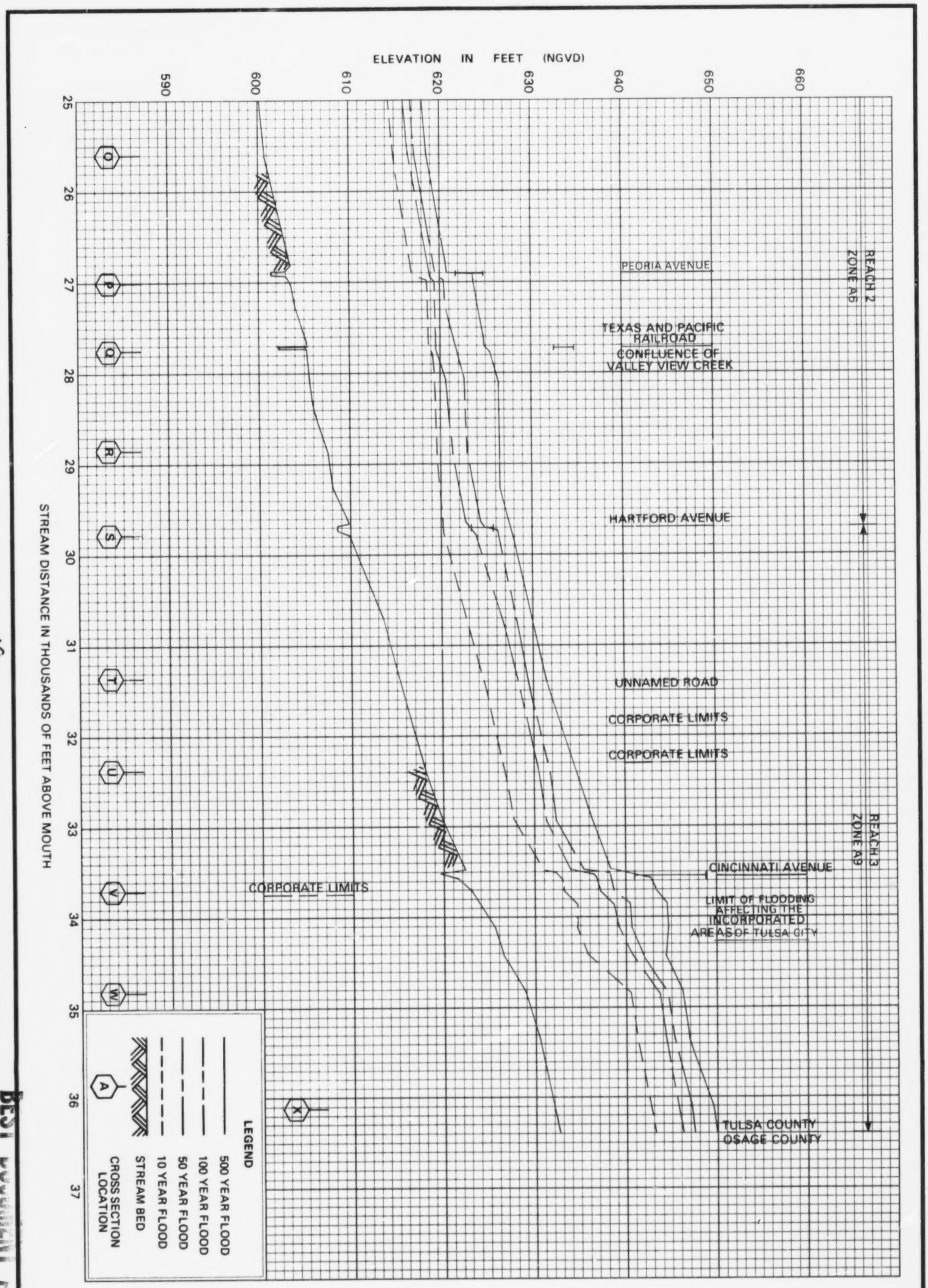

109

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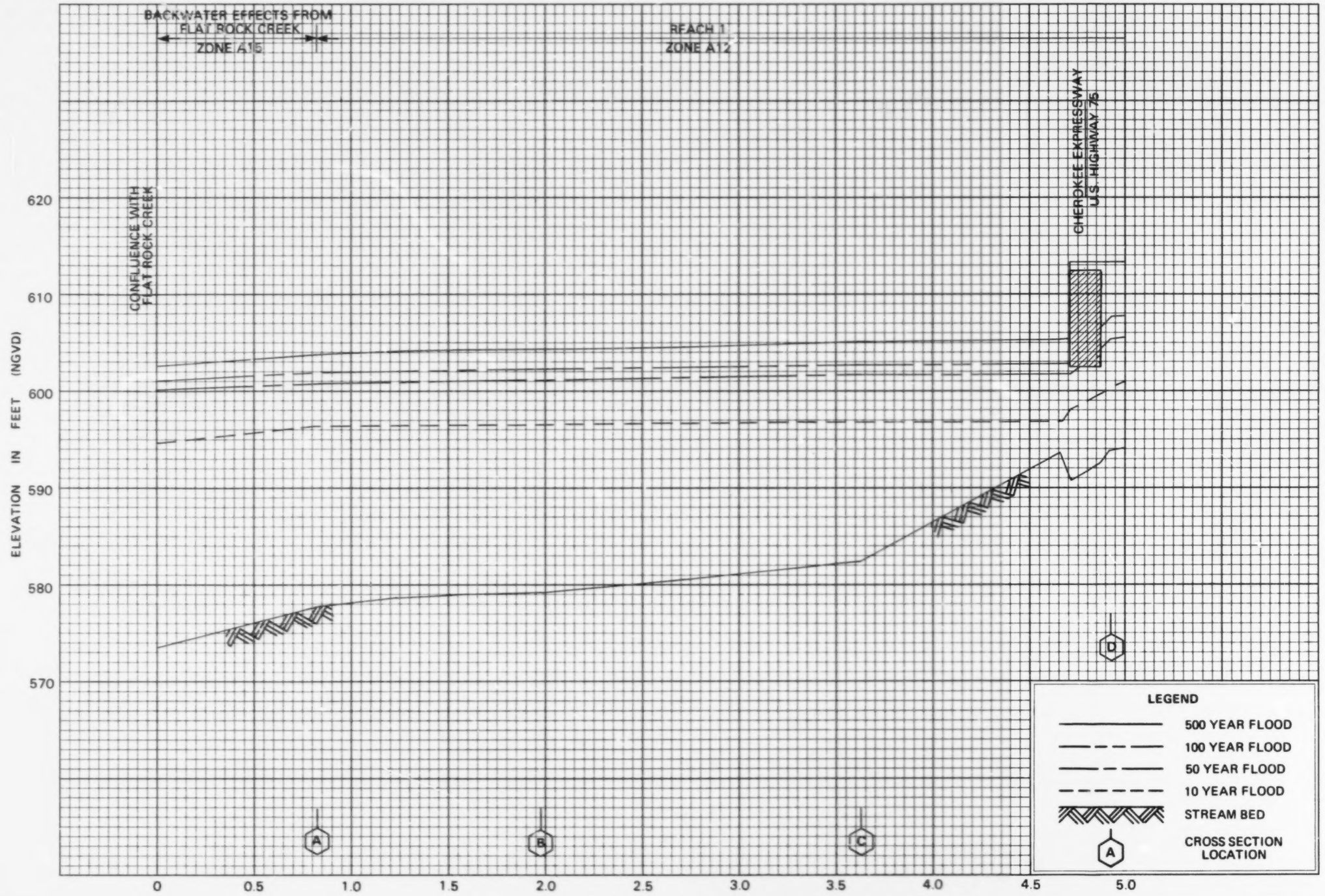
17P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF TULSA, OK (TULSA, OSAGE, AND ROGERS COS.)	FLOOD PROFILES FLAT ROCK CREEK



FLOOD PROFILES

FLAT ROCK CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

18P

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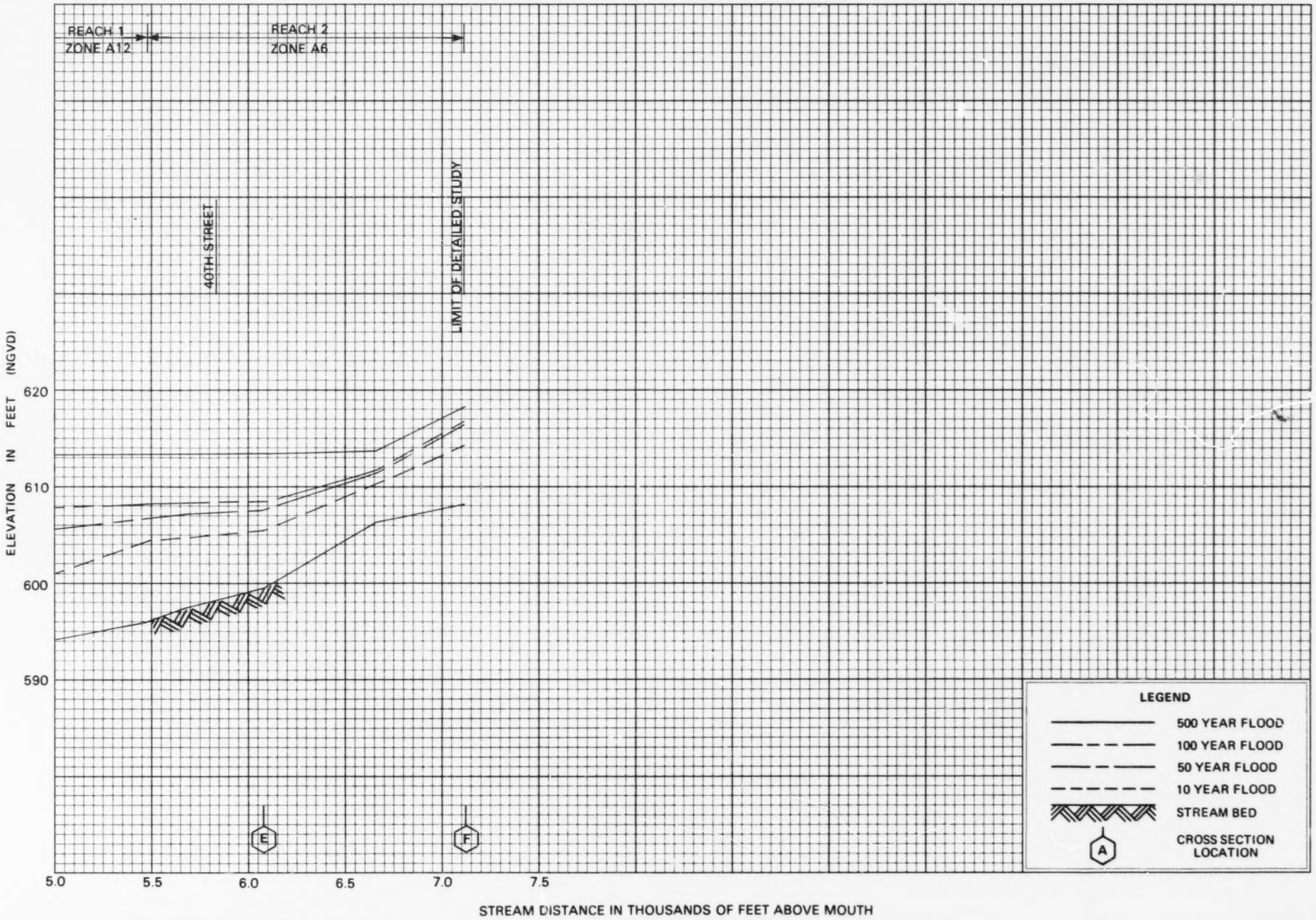

FLOOD PROFILES

FLAT ROCK CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

19P

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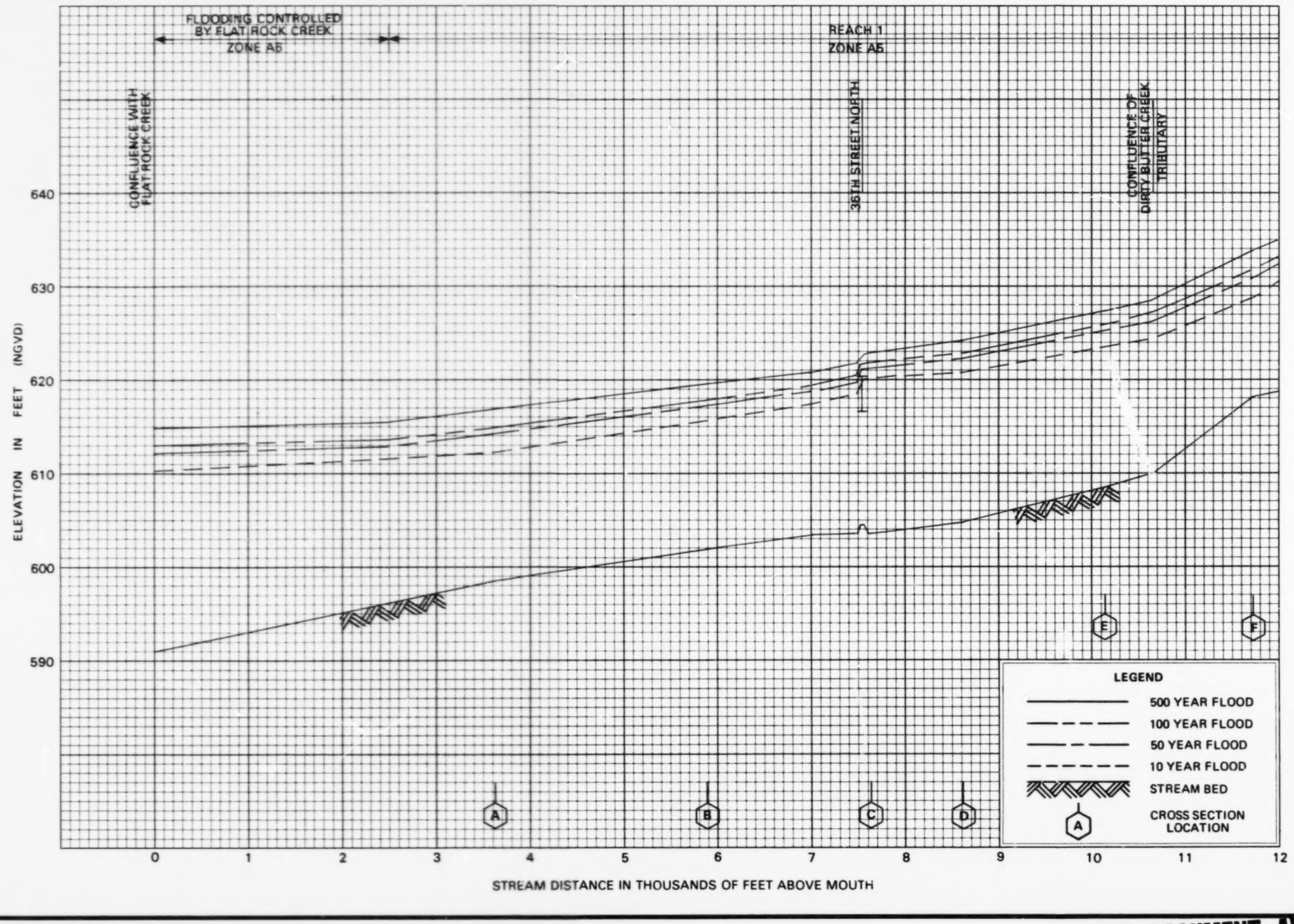

FLOOD PROFILES

DIRTY BUTTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

20P

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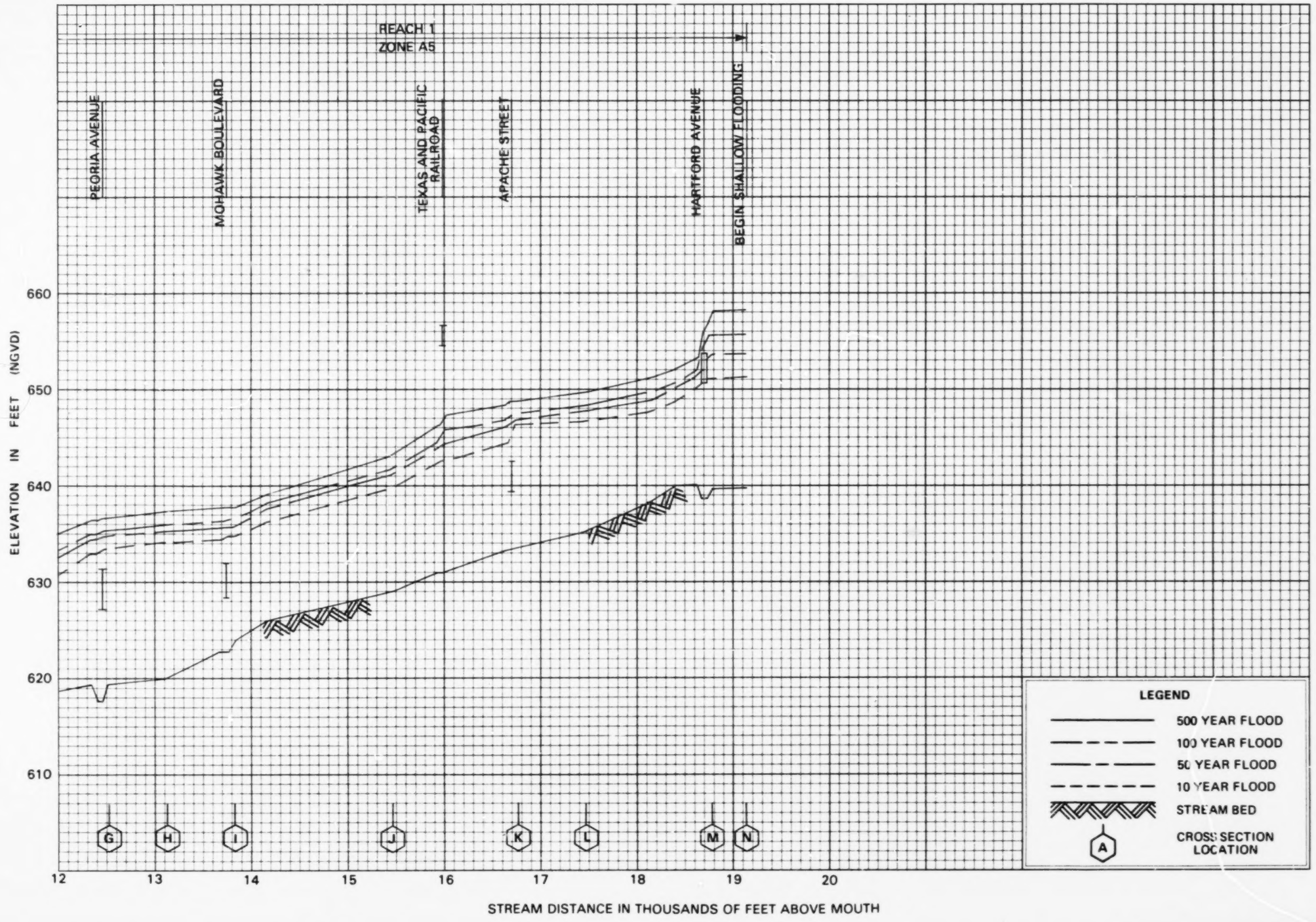

FLOOD PROFILES

DIRTY BUTTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

21P

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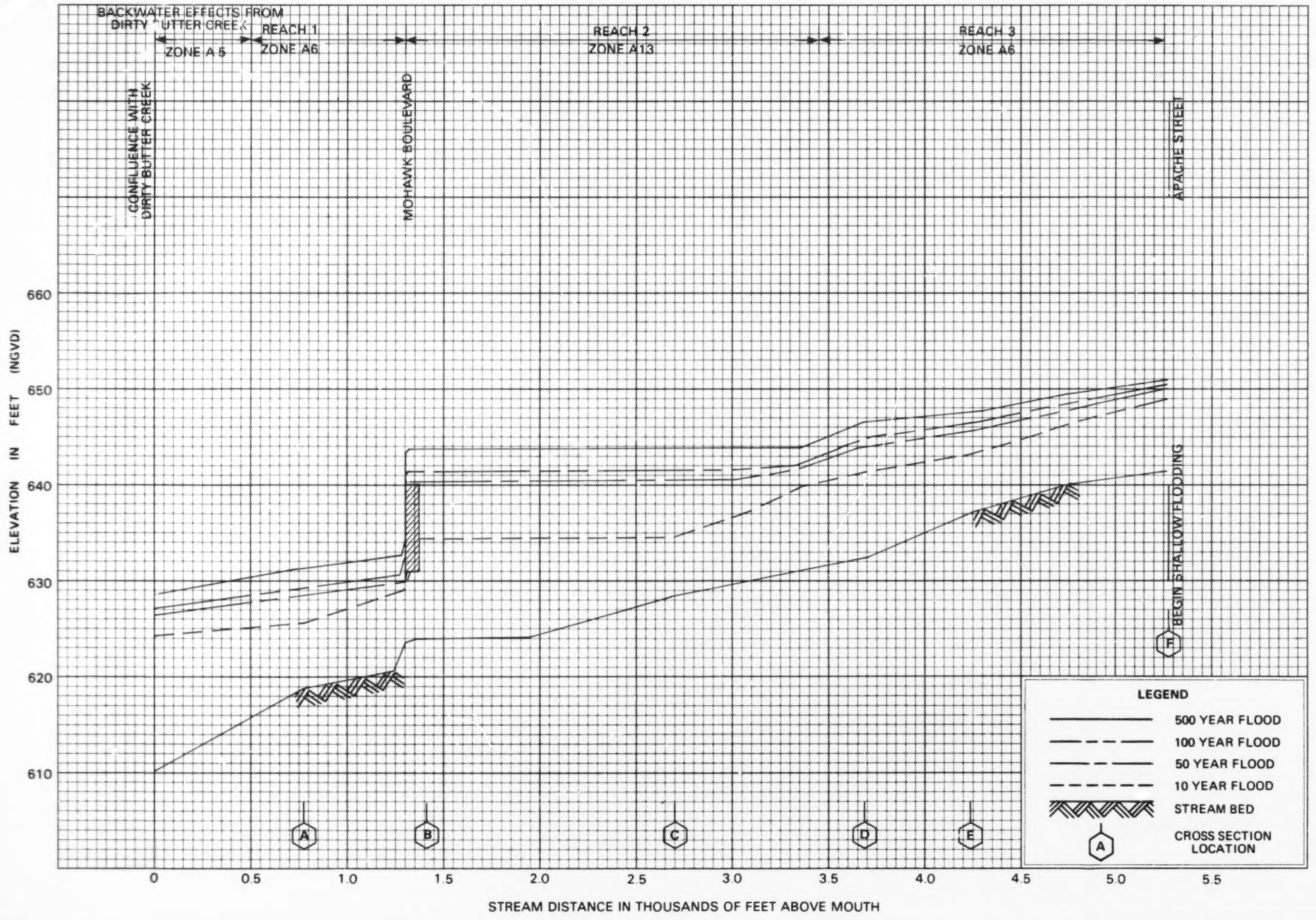

FLOOD PROFILES

DIRTY BUTTER CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

22P

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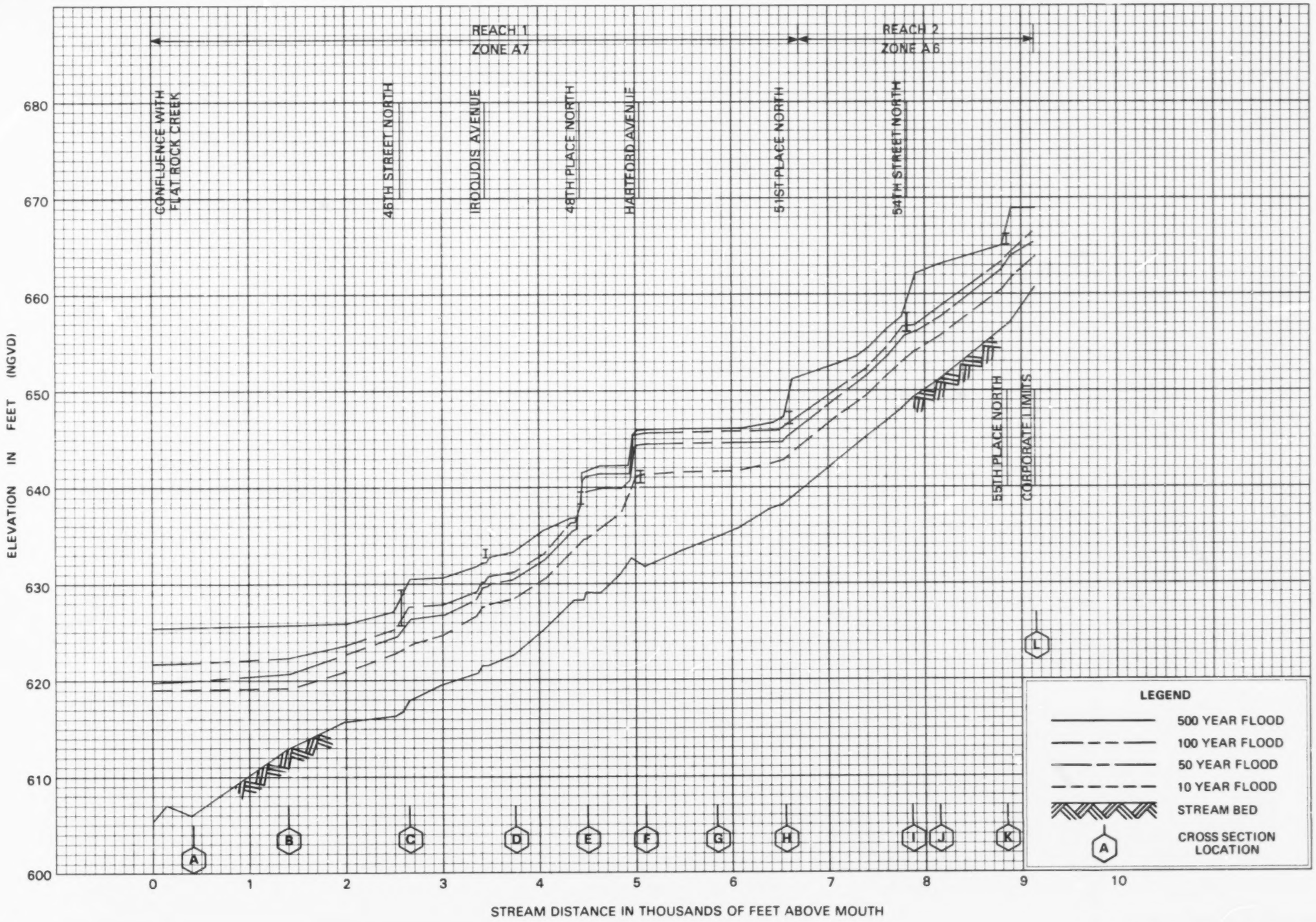

FLOOD PROFILES

VALLEY VIEW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

23P

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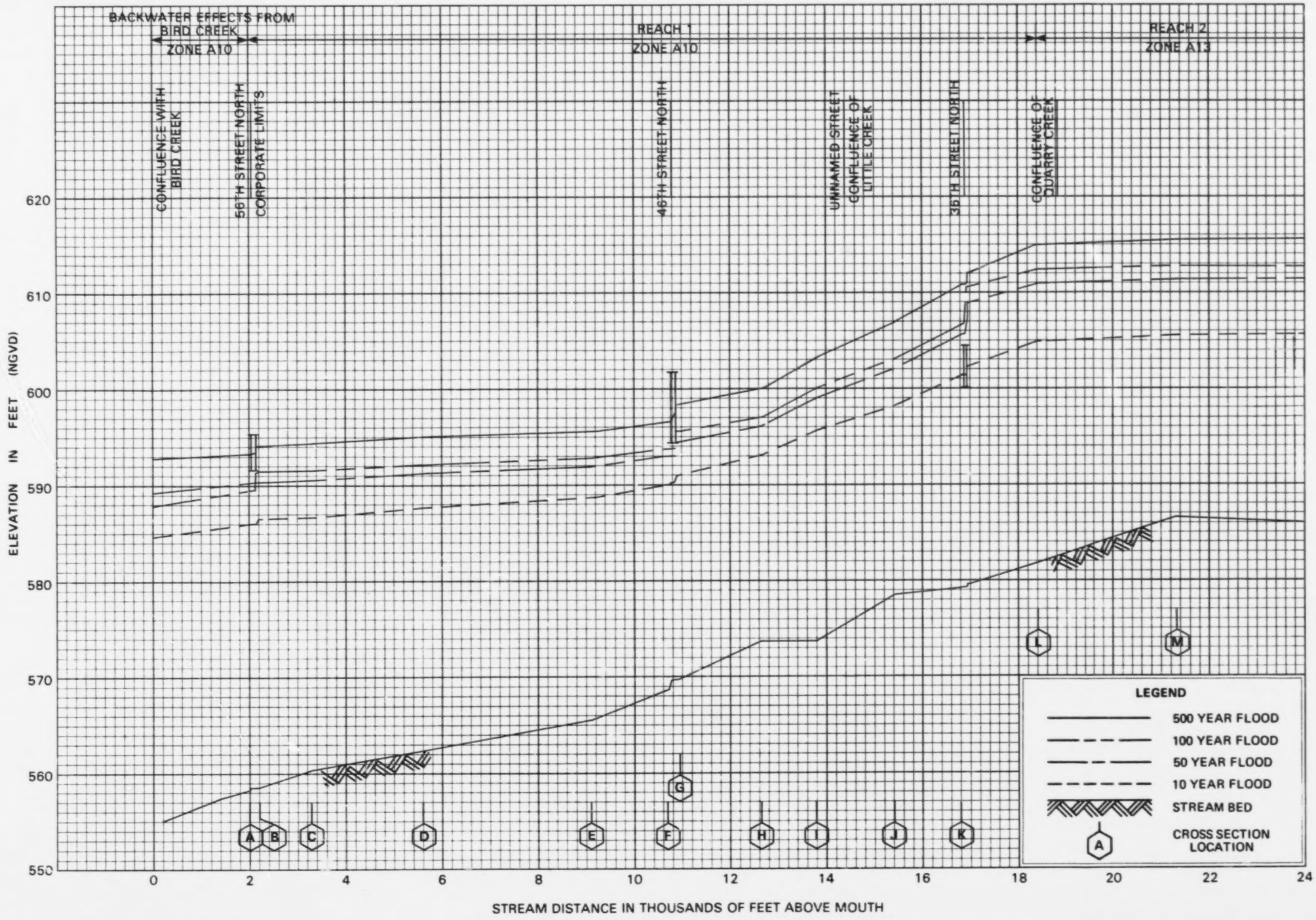

FLOOD PROFILES

MINGO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

24P

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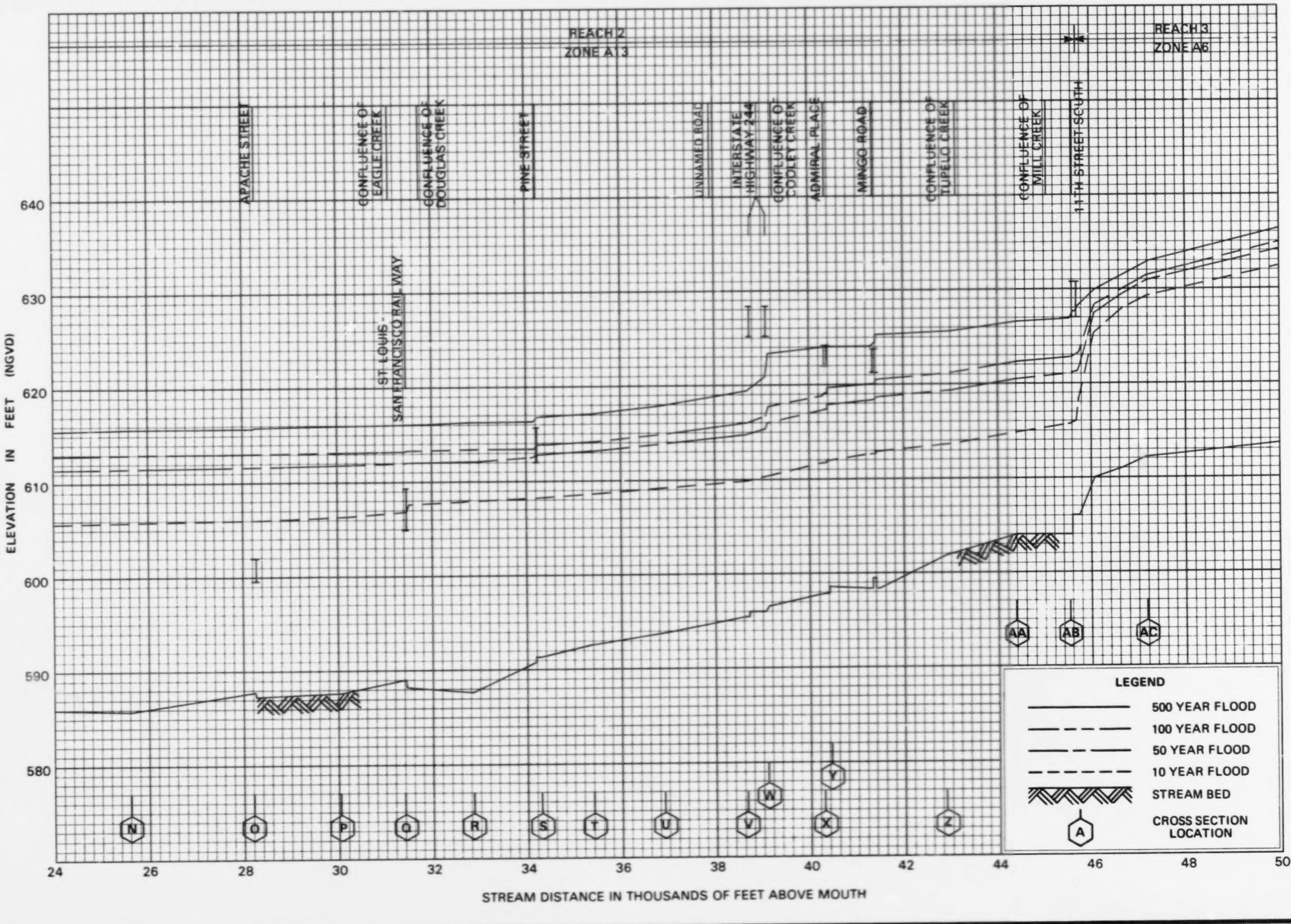

FLOOD PROFILES

MINGO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

25P

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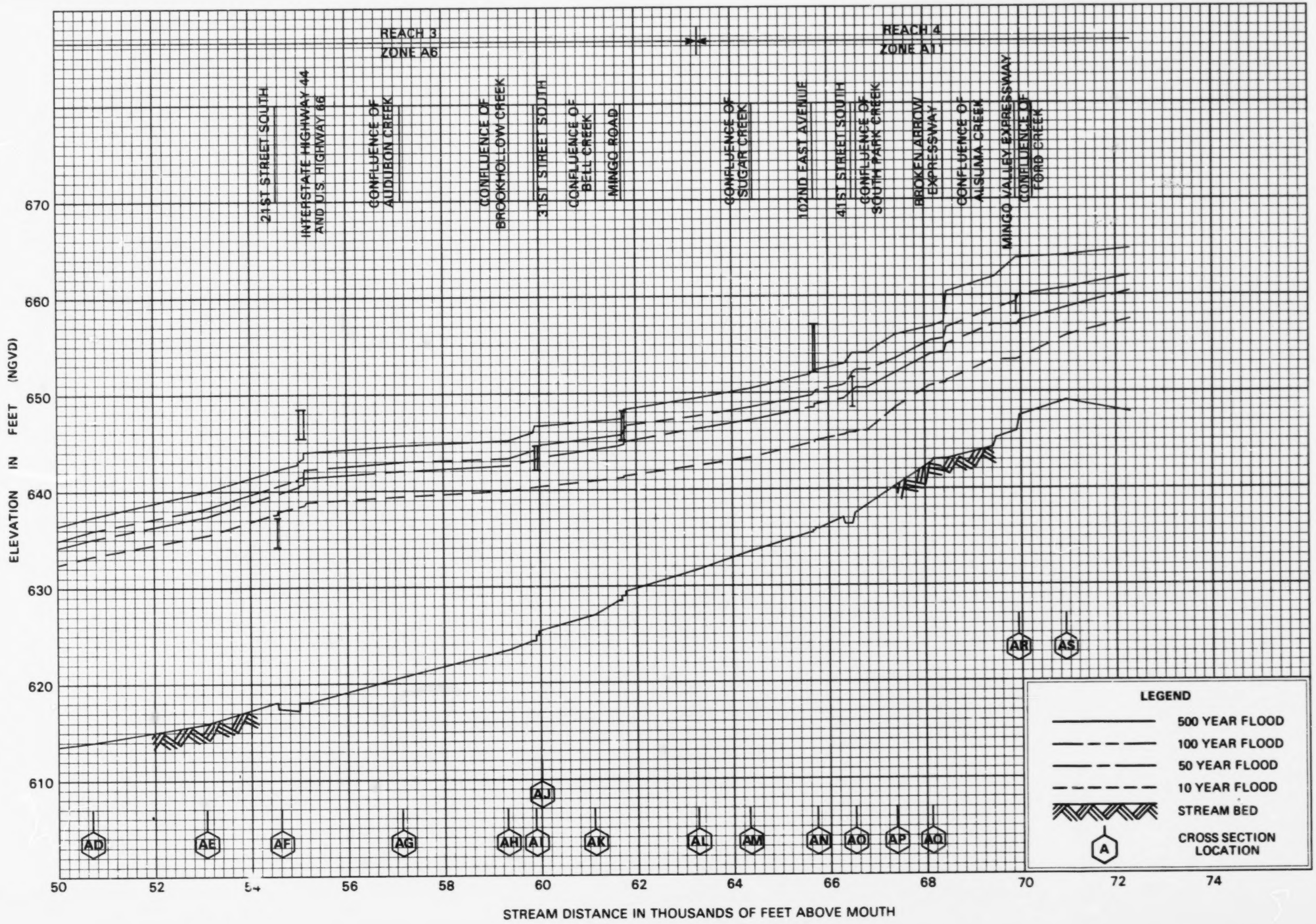

FLOOD PROFILES

MINGO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

26P

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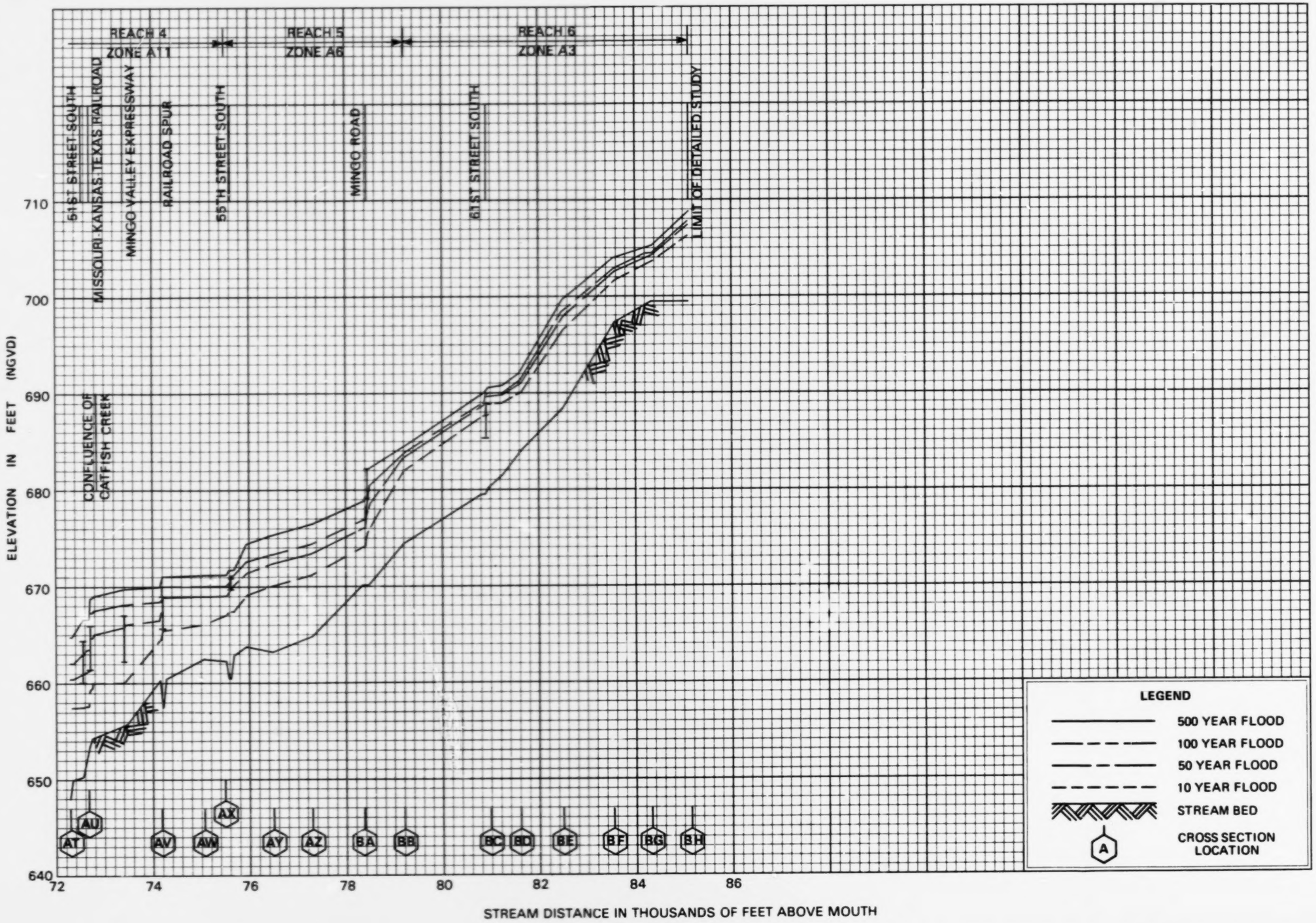

FLOOD PROFILES

MINGO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

27P

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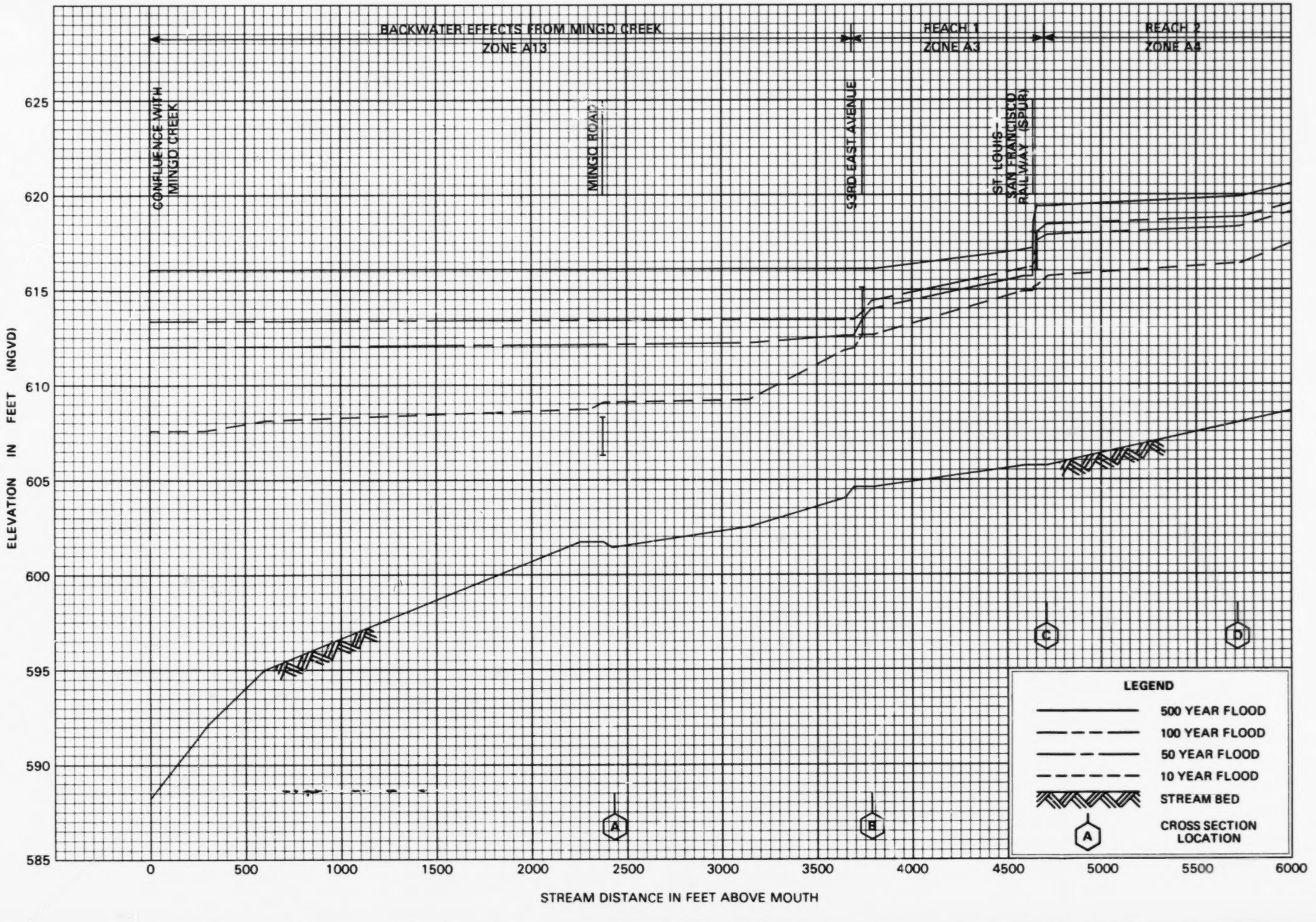

FLOOD PROFILES

DOUGLAS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

28P

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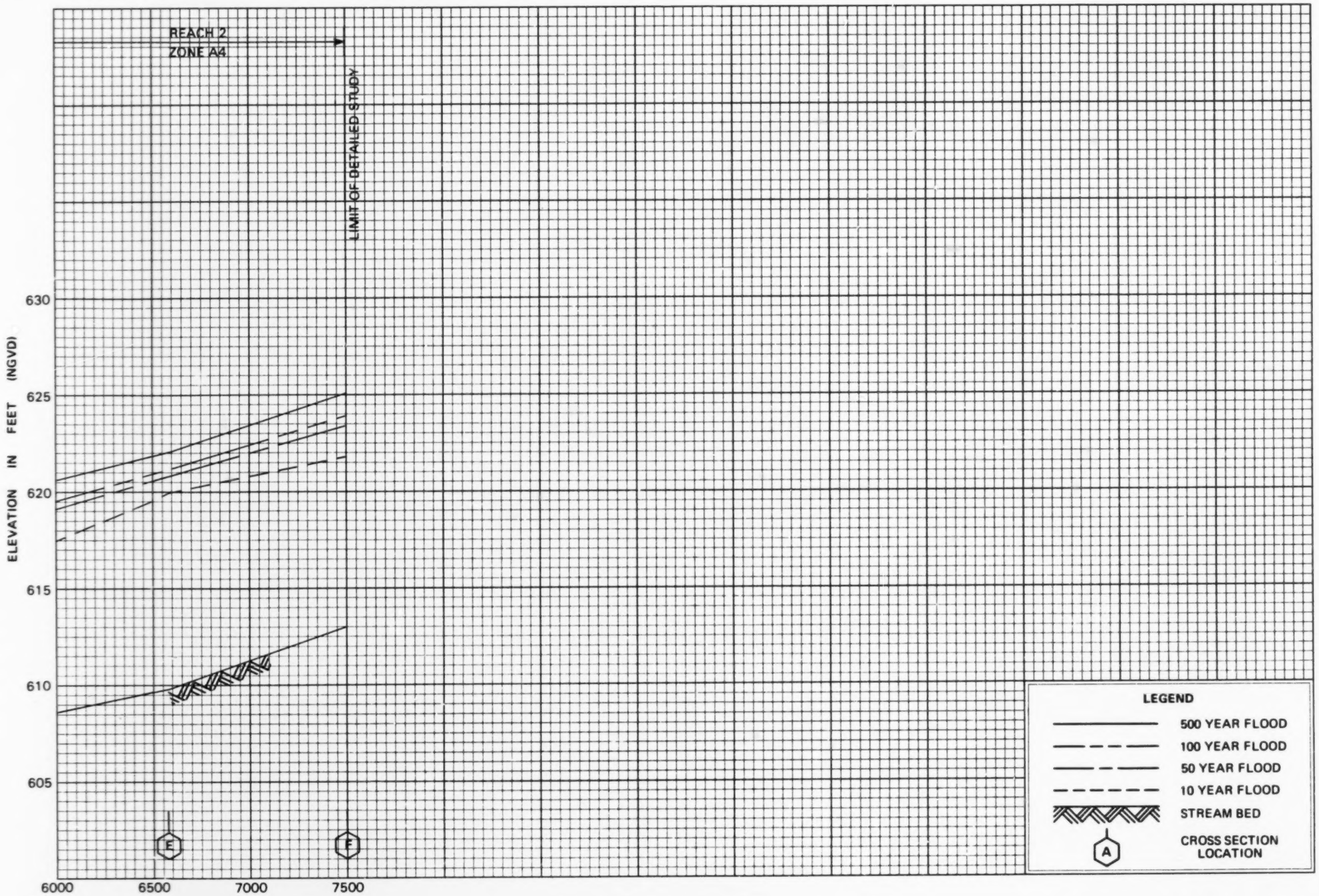

FLOOD PROFILES

DOUGLAS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

29P

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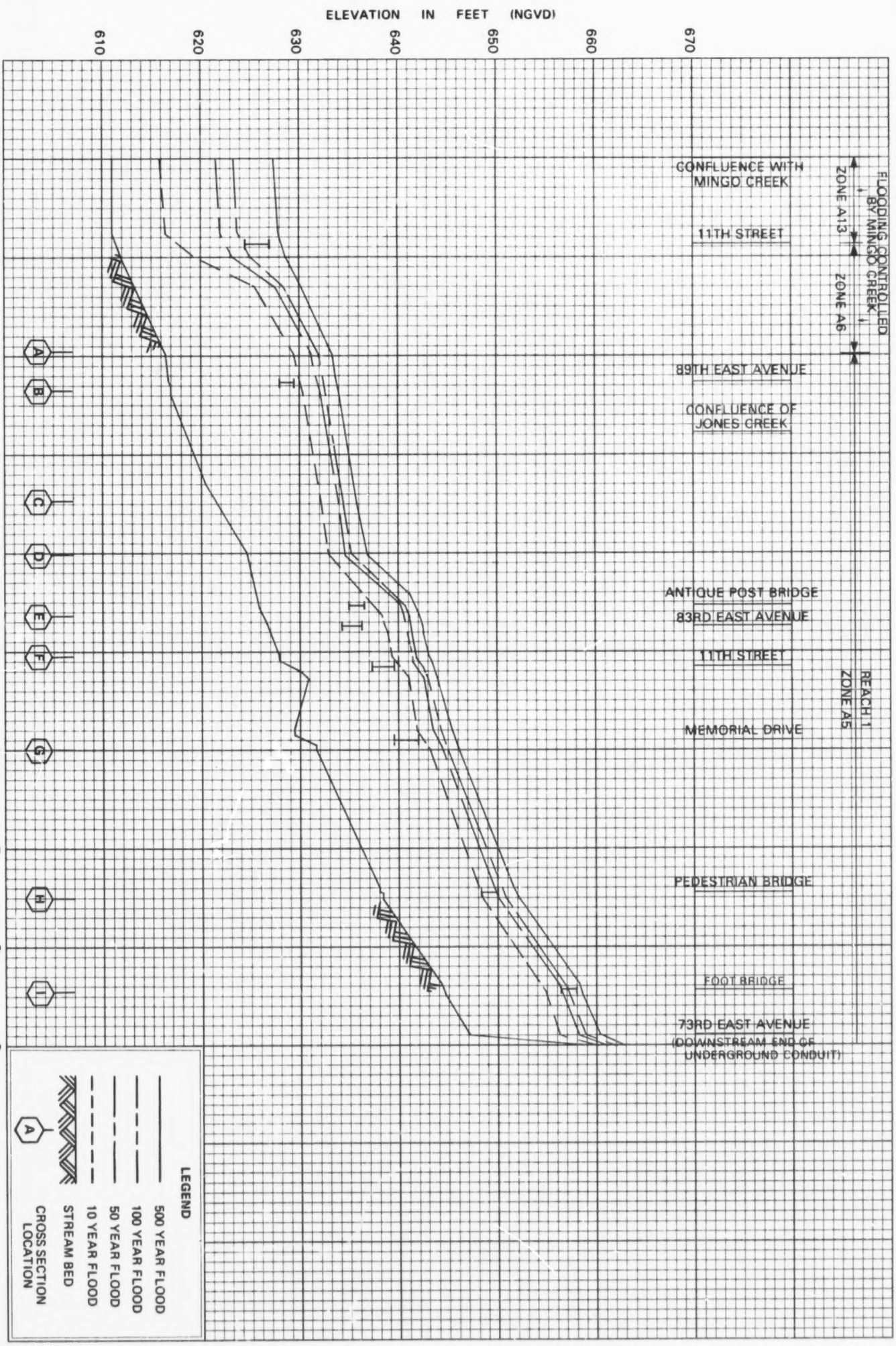

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

MILL CREEK

30P

122

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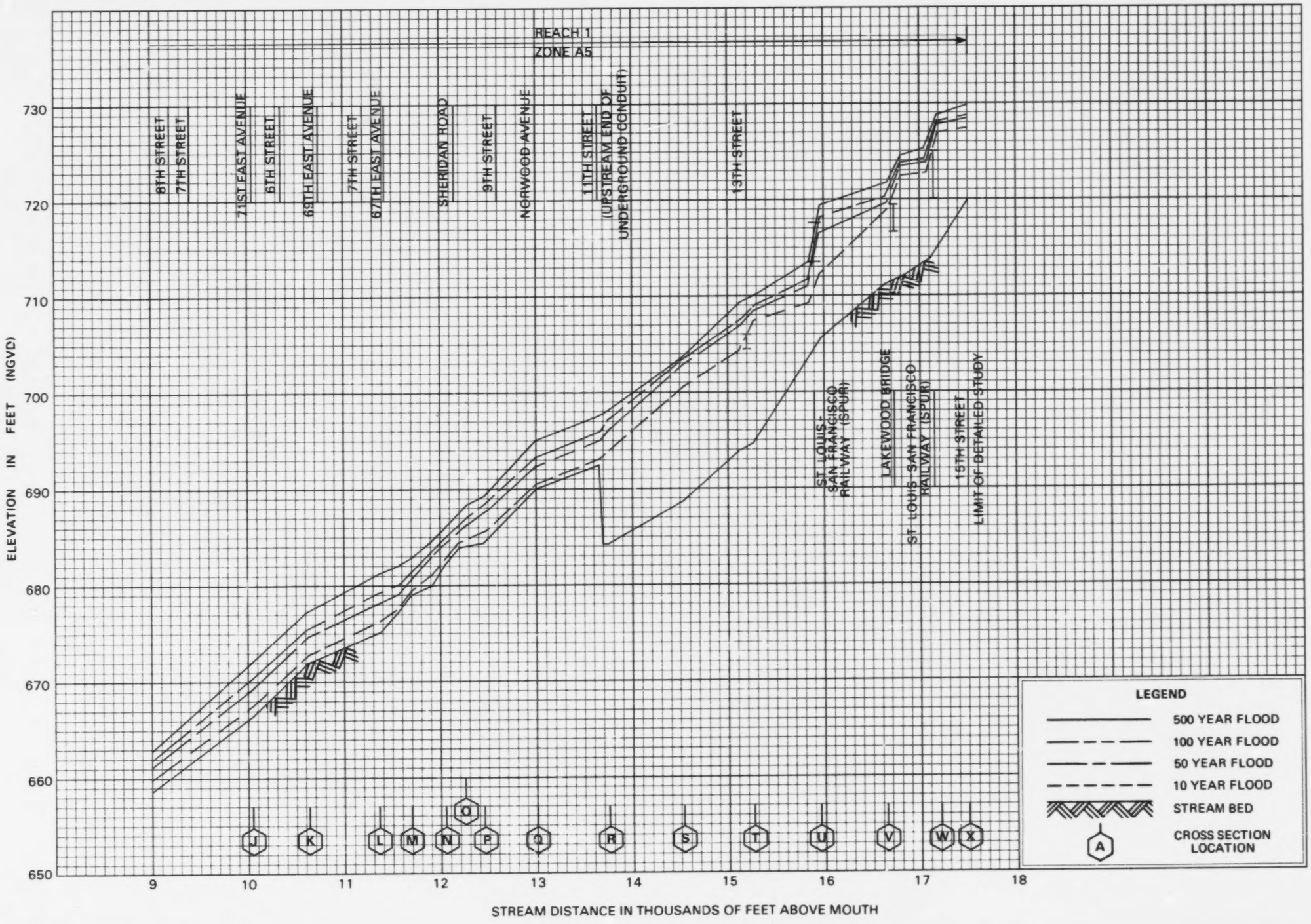

FLOOD PROFILES

MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

31P

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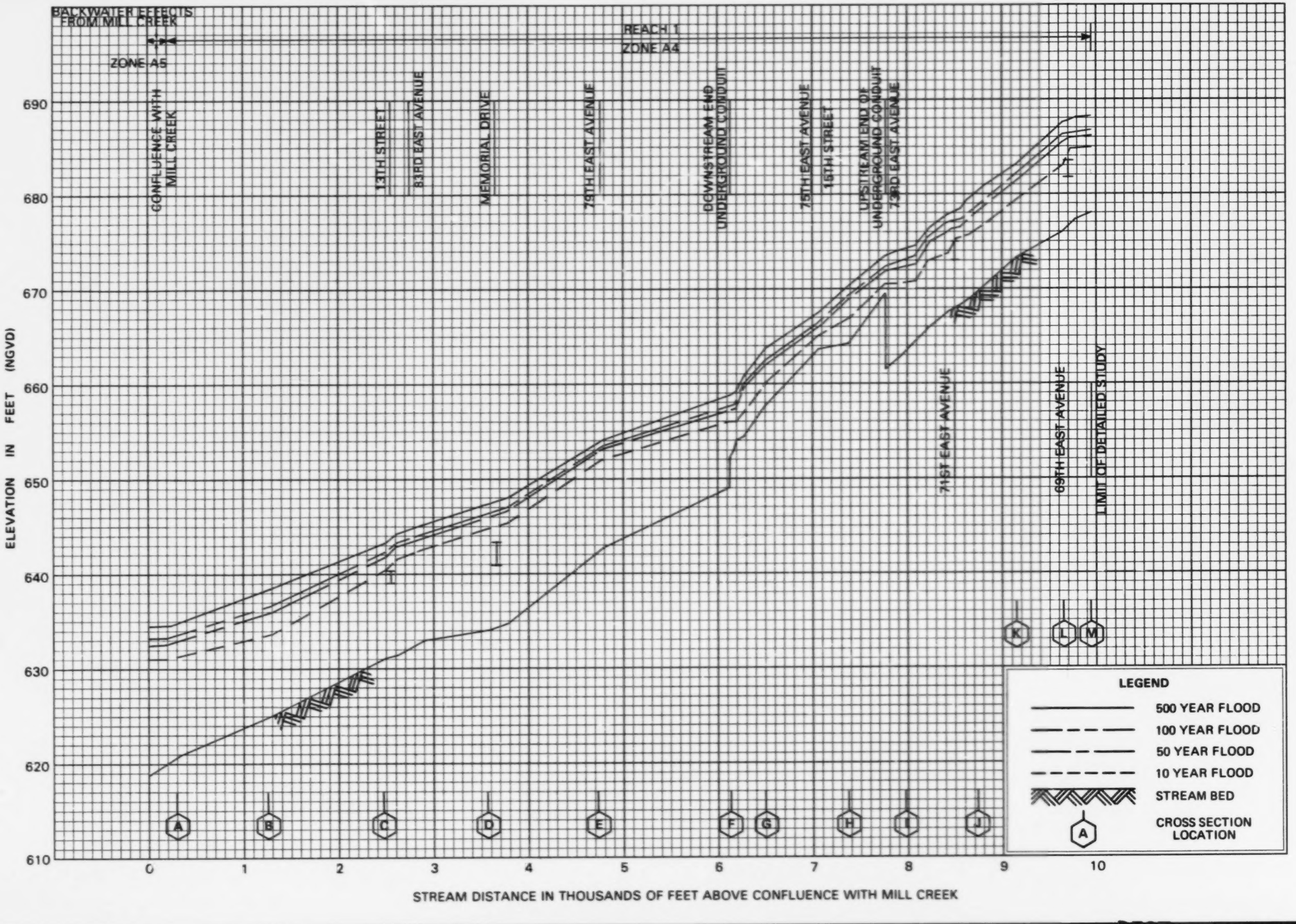

FLOOD PROFILES

JONES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

32P

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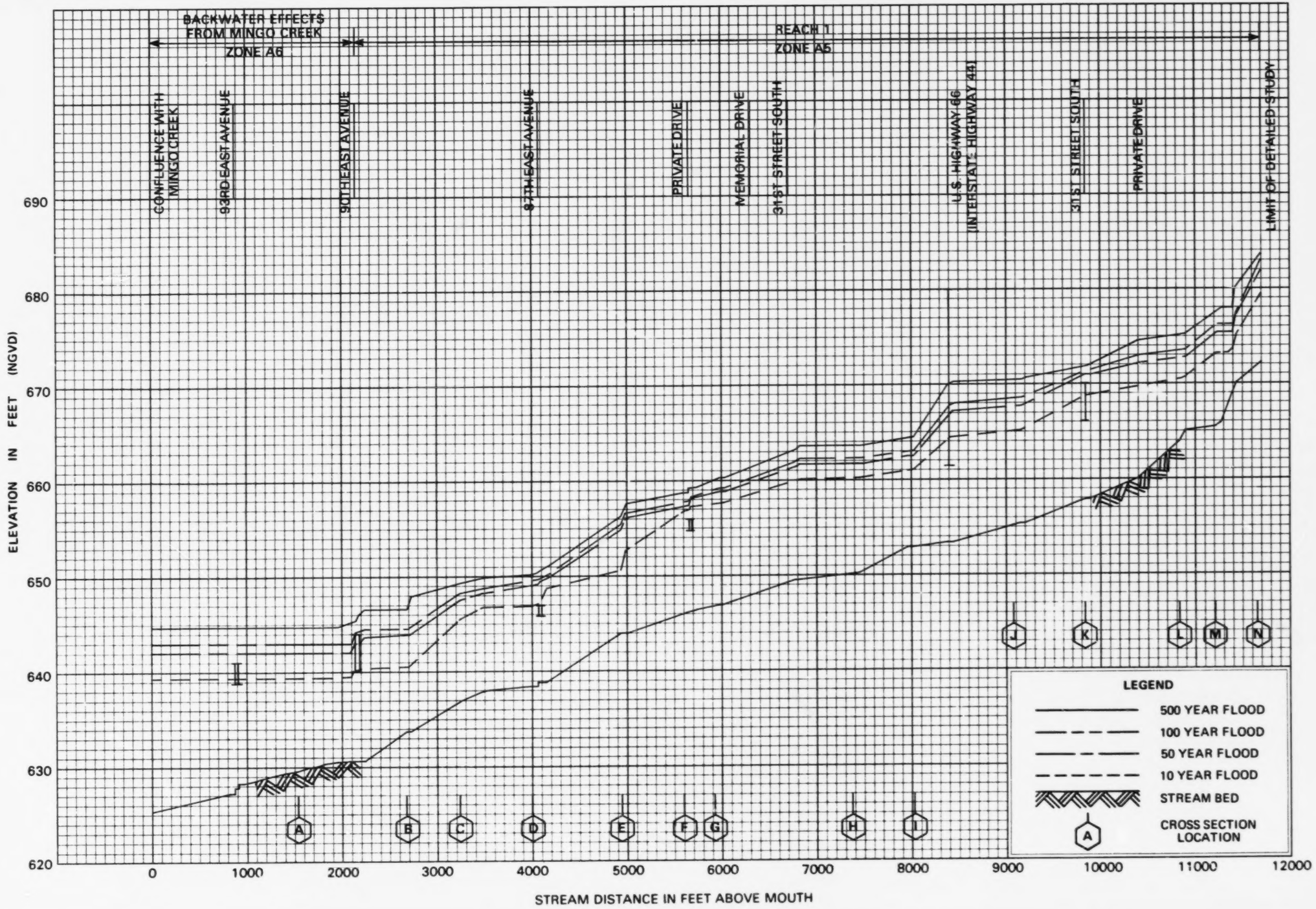

FLOOD PROFILES

AUDUBON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

33P

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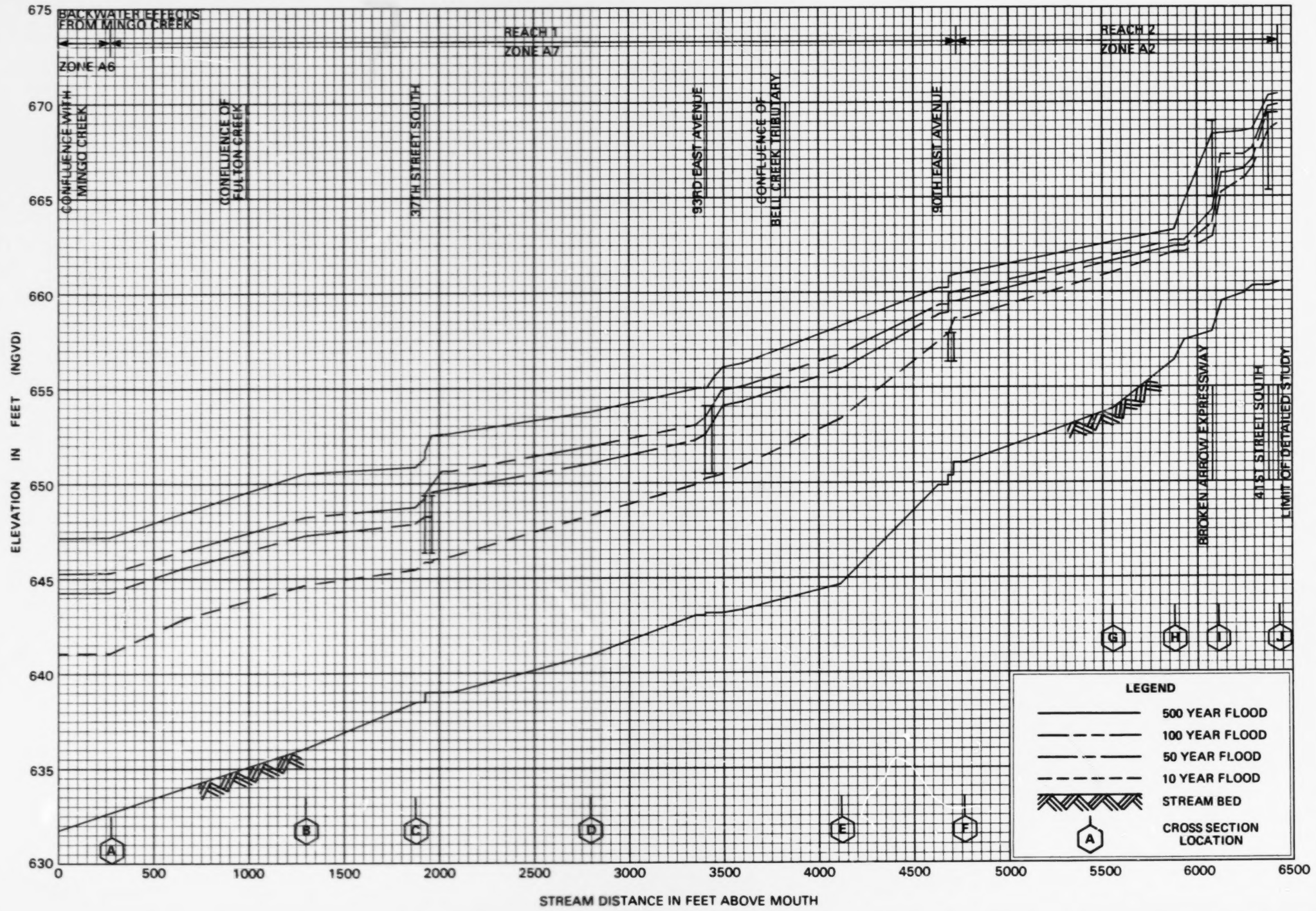

FLOOD PROFILES

BELL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

34P

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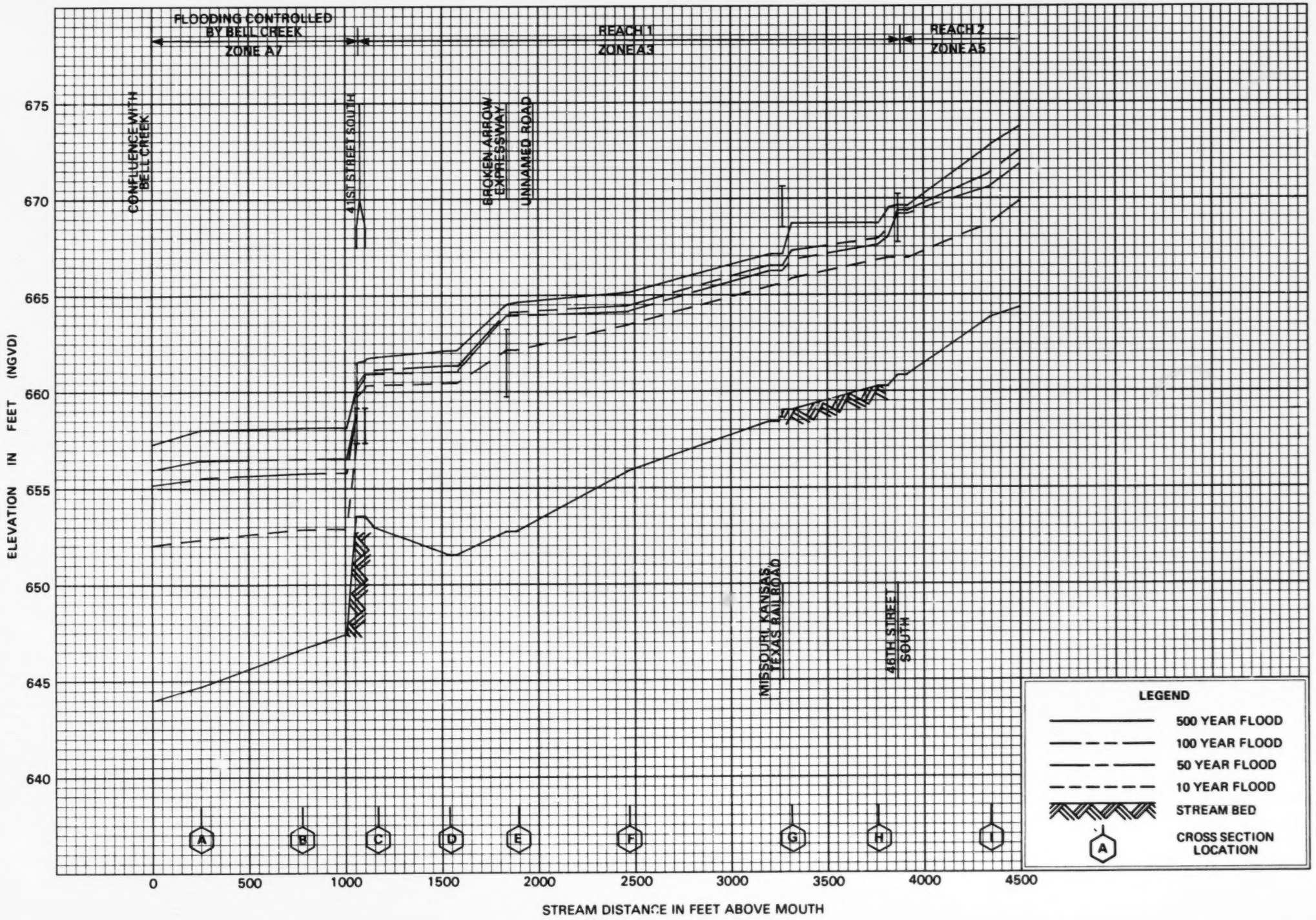

FLOOD PROFILES

BELL CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

35P

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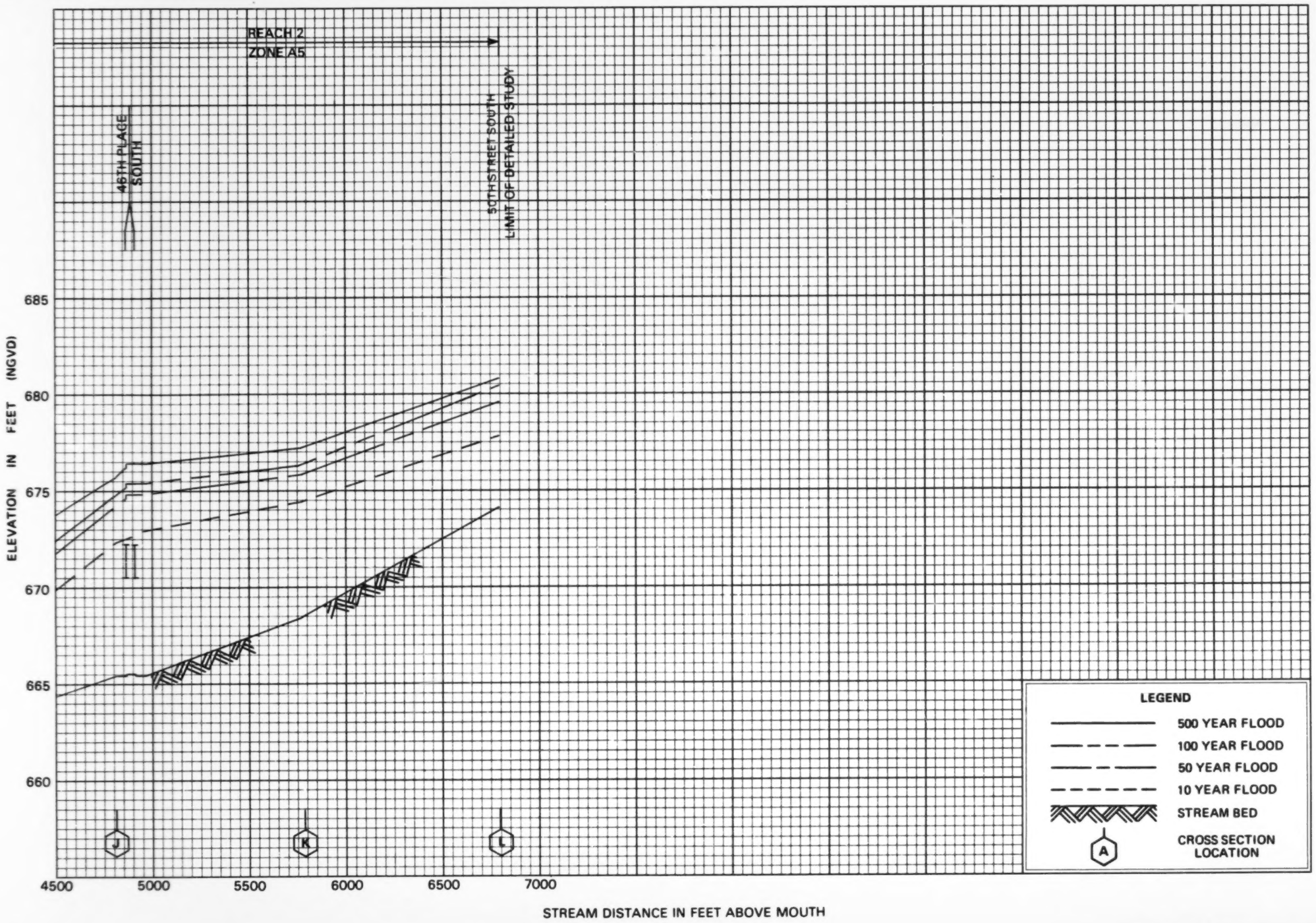

FLOOD PROFILES

BELL CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

36P

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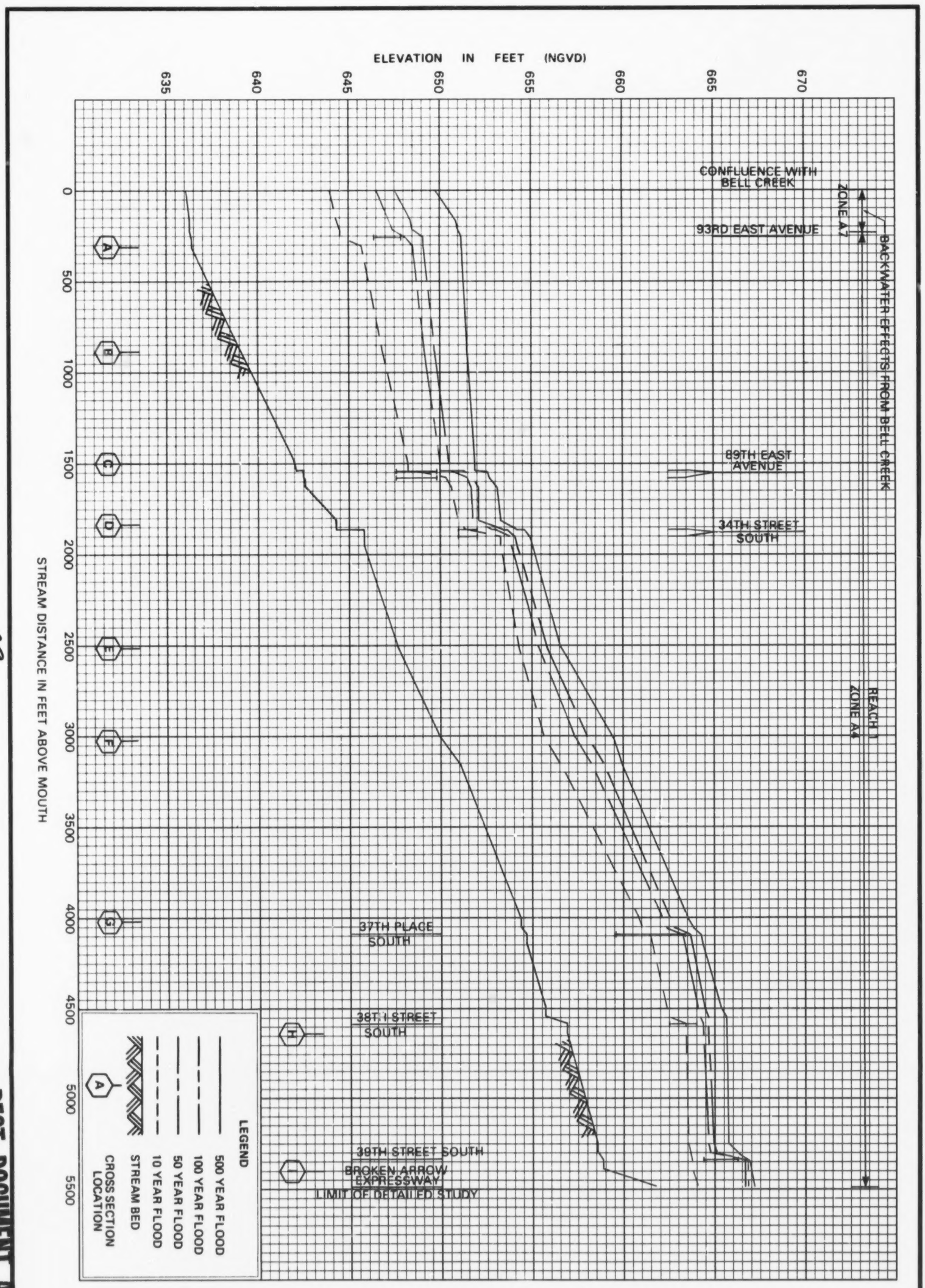


FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

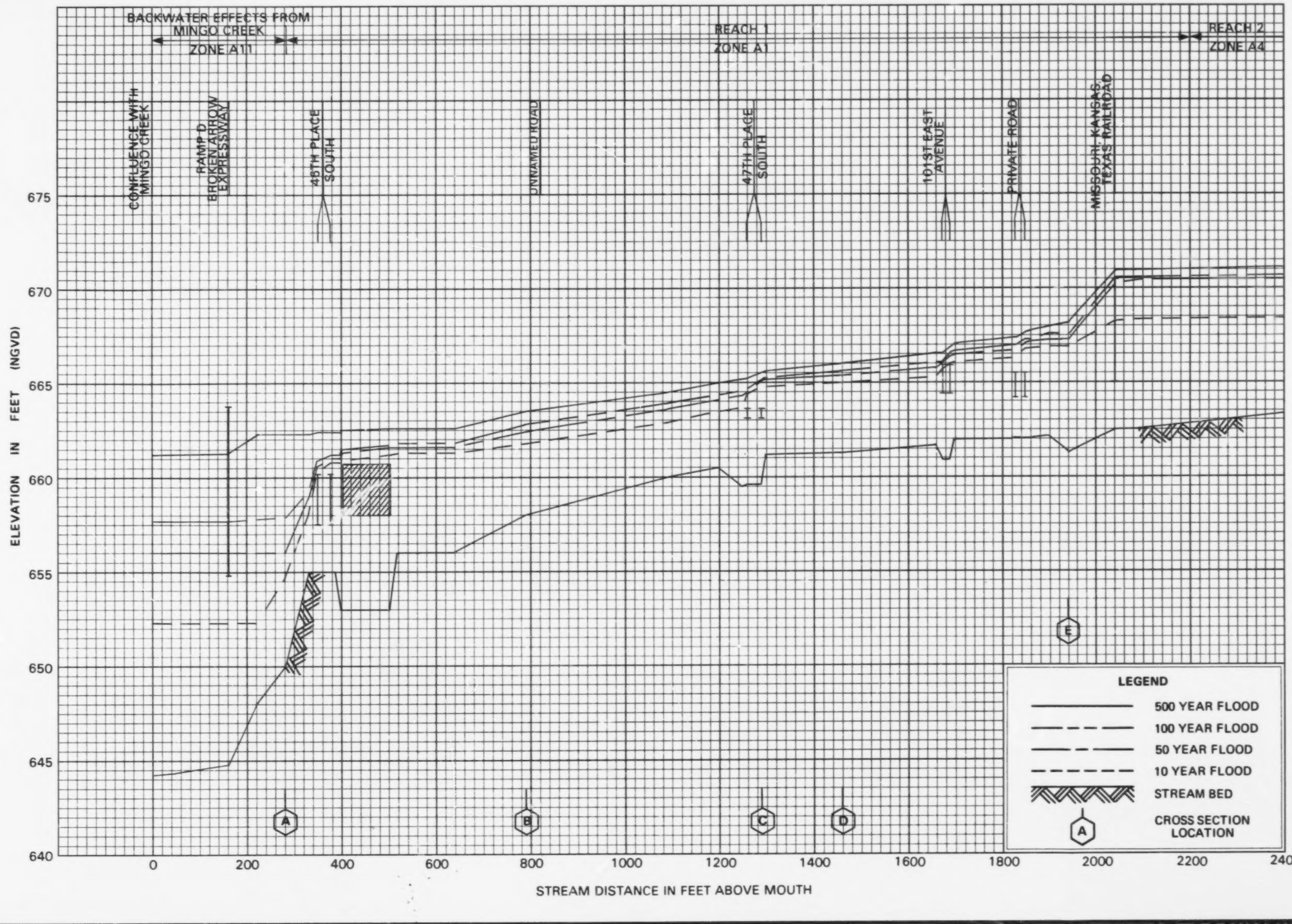
FLOOD PROFILES

FULTON CREEK

129

BEST DOCUMENT AVAILABLE

37P



FLOOD PROFILES

ALSUMA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

38P

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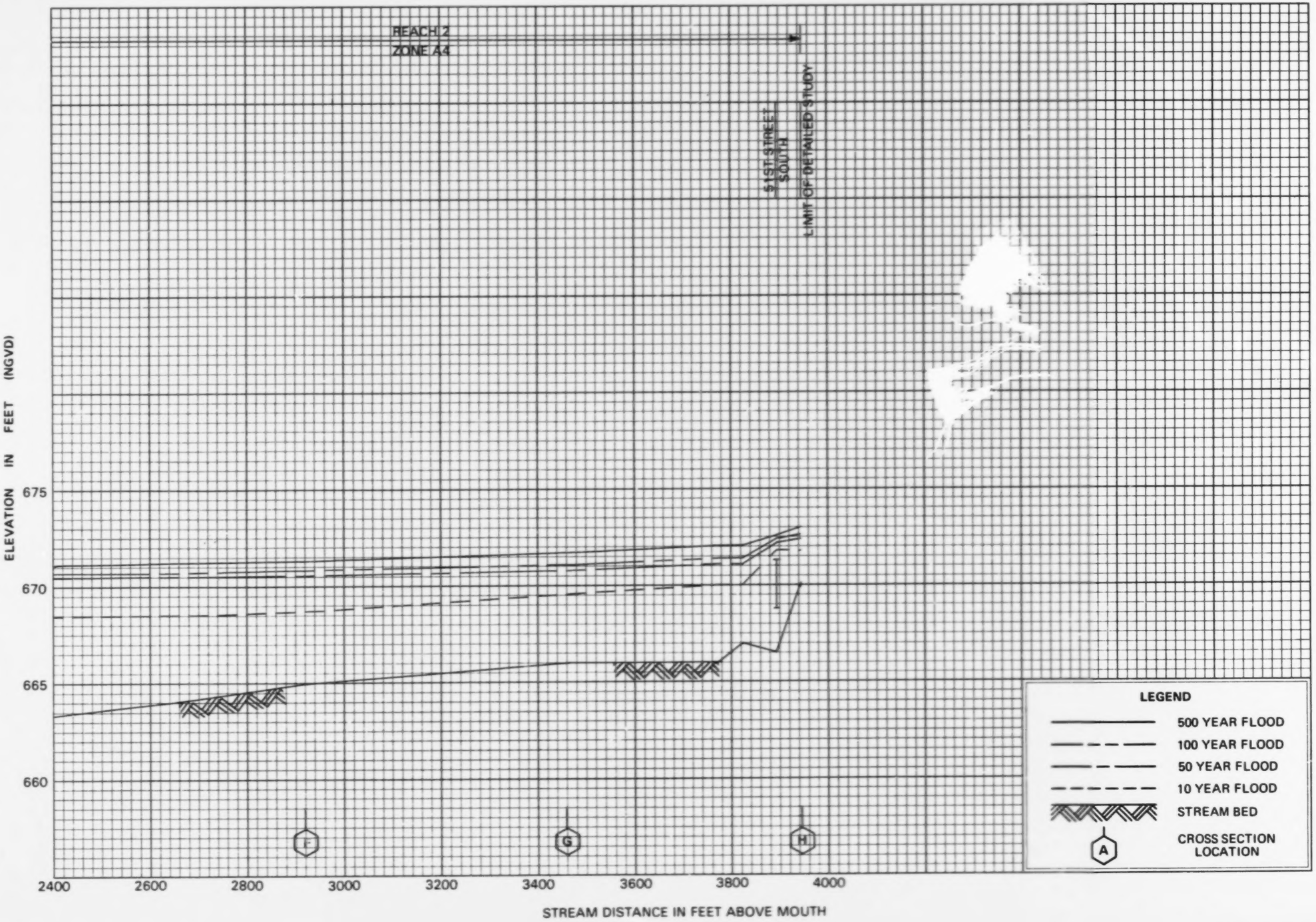

FLOOD PROFILES

ALSUMA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

39P

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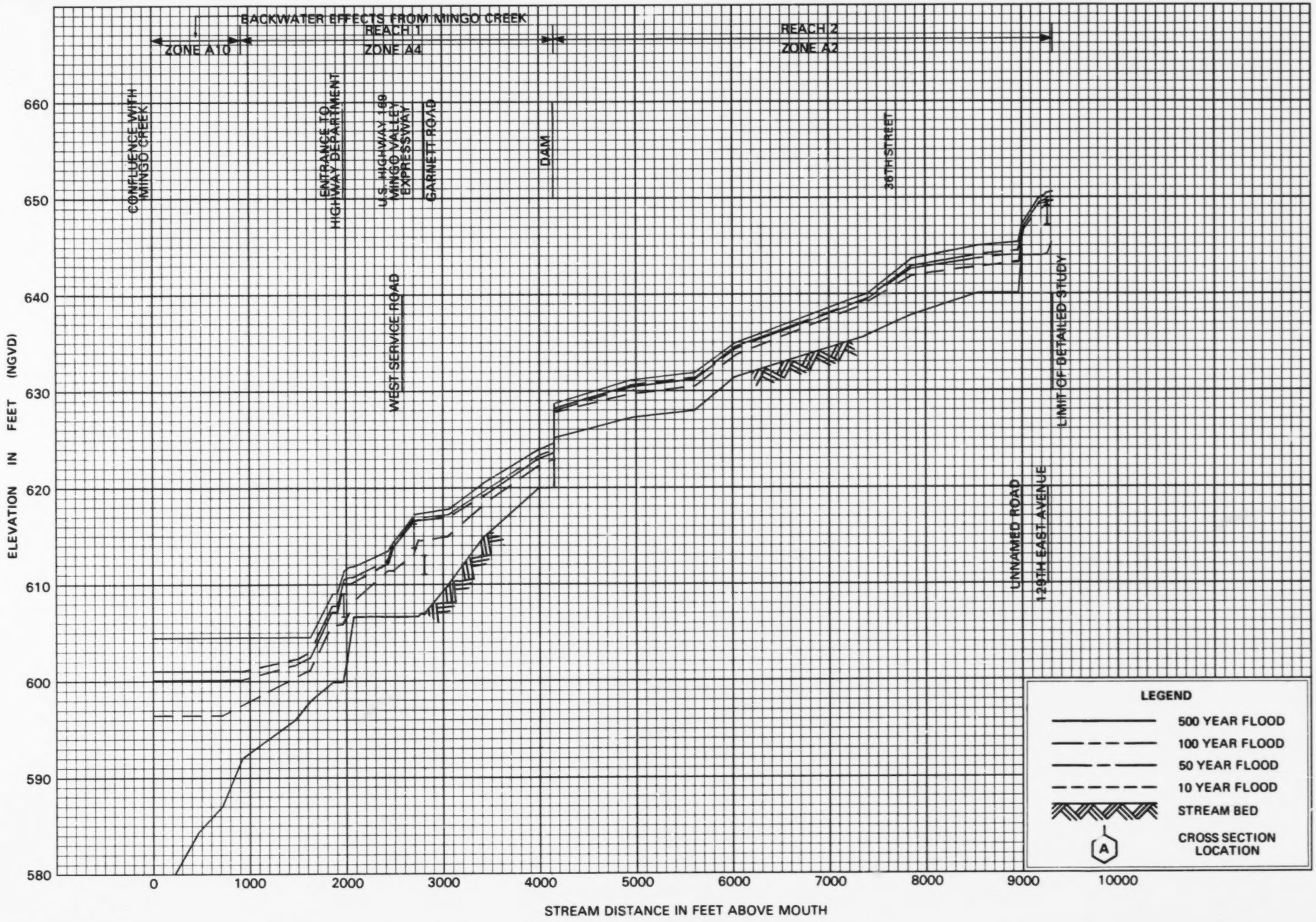


FLOOD PROFILES

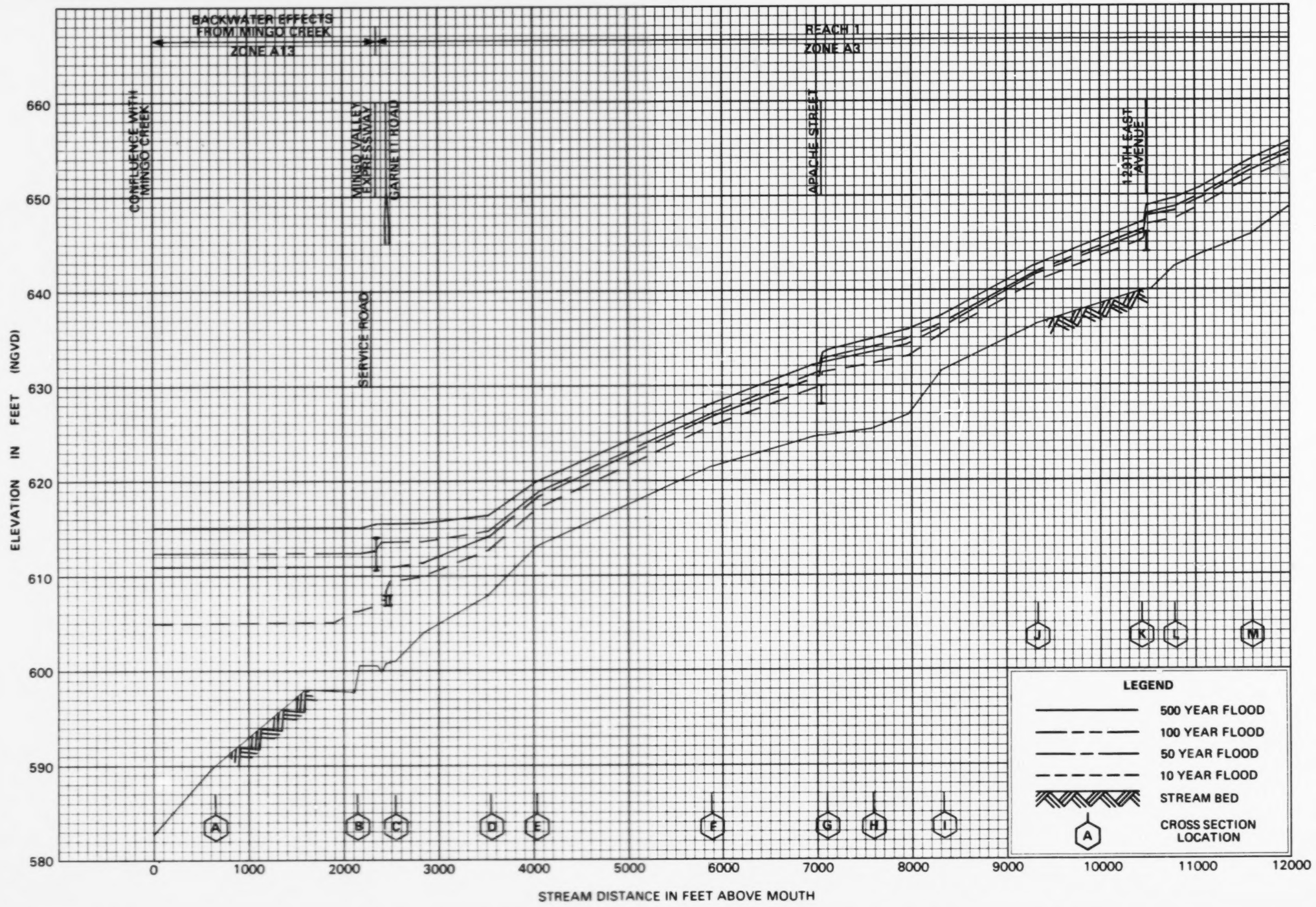
LITTLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

40P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

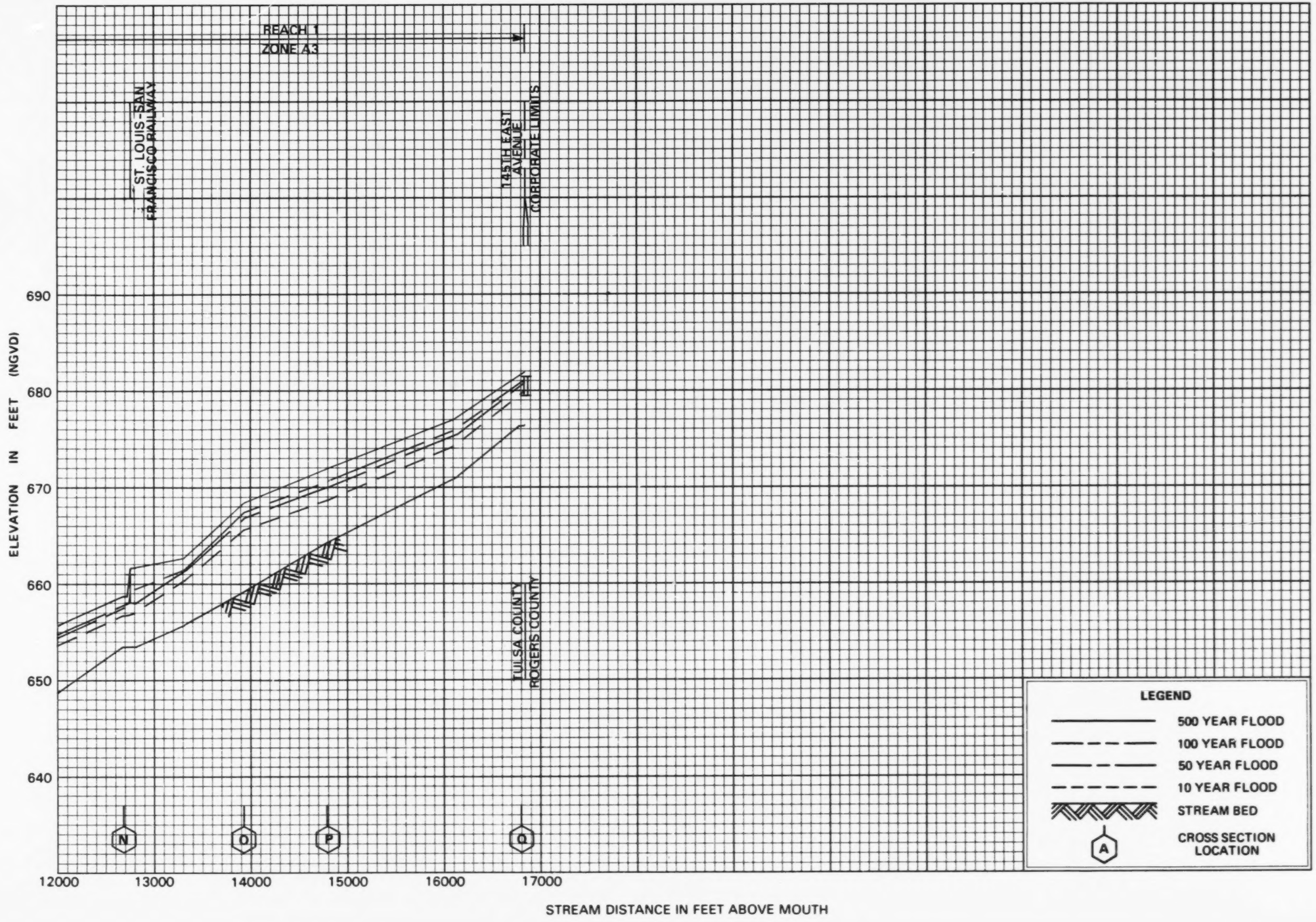
QUARRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

41P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

QUARRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

42P

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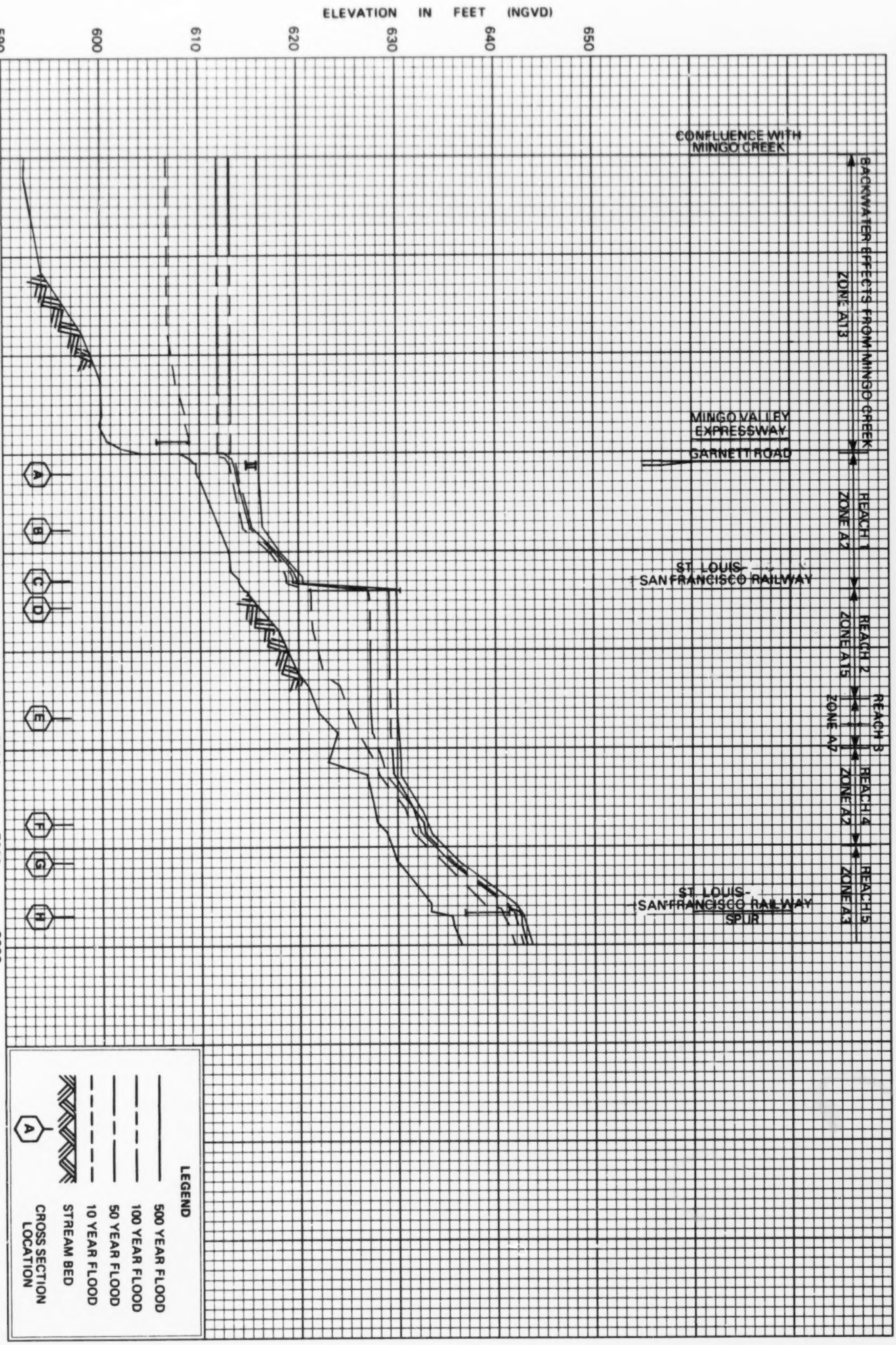
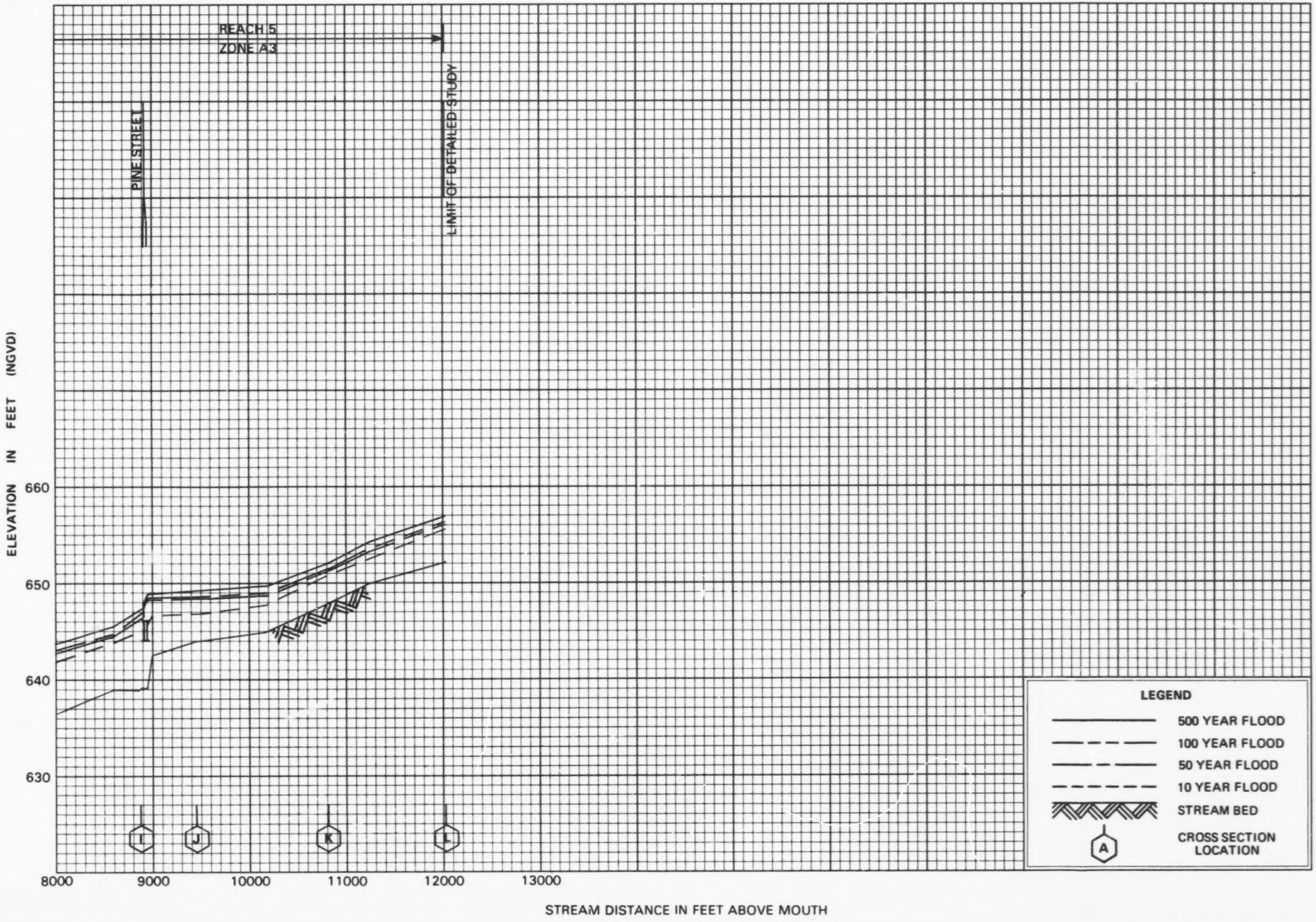


43P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF TULSA, OK (TULSA, OSAGE, AND ROGERS COS.)	FLOOD PROFILES EAGLE CREEK

135

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

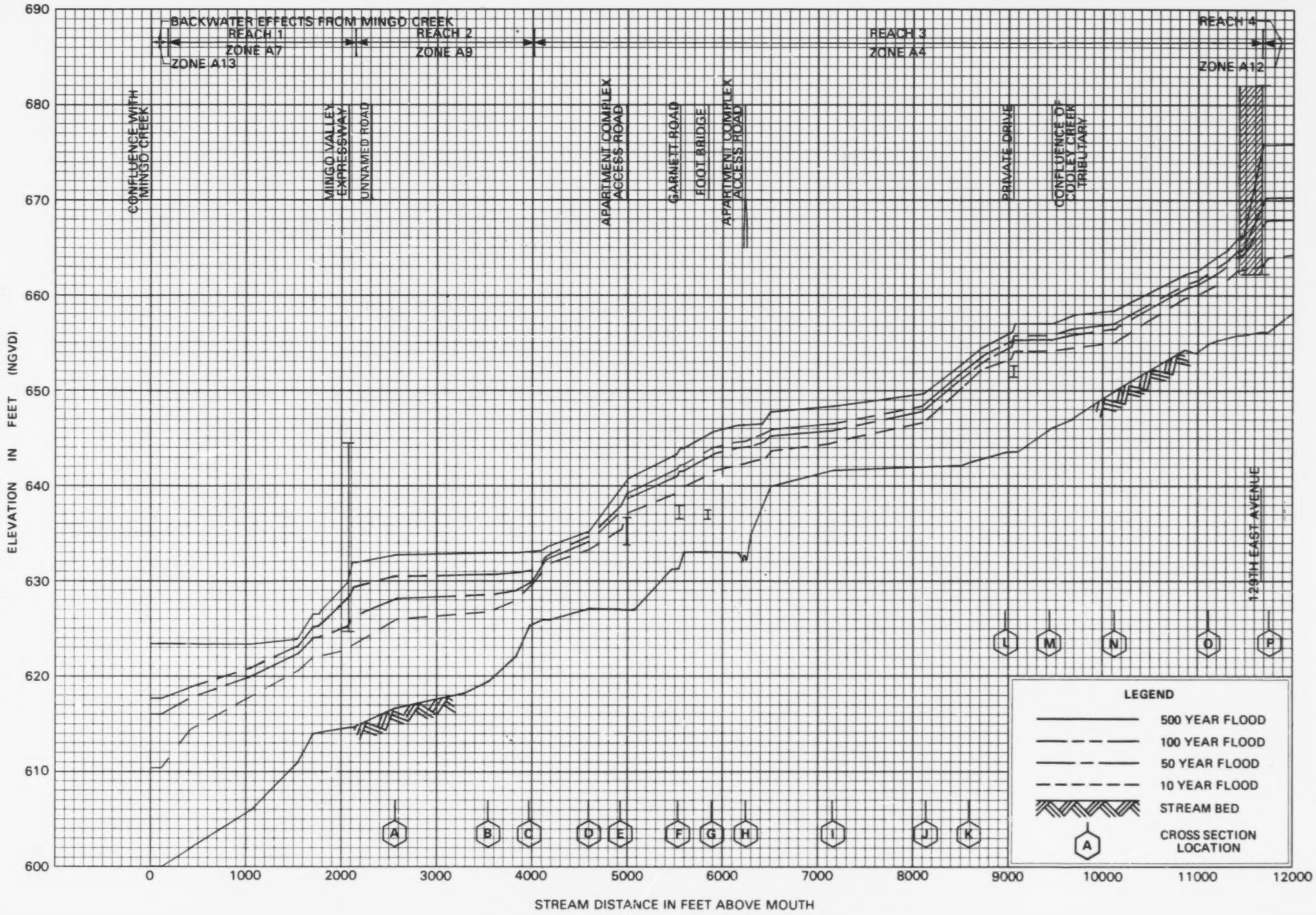
EAGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

44P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

COOLEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

45P

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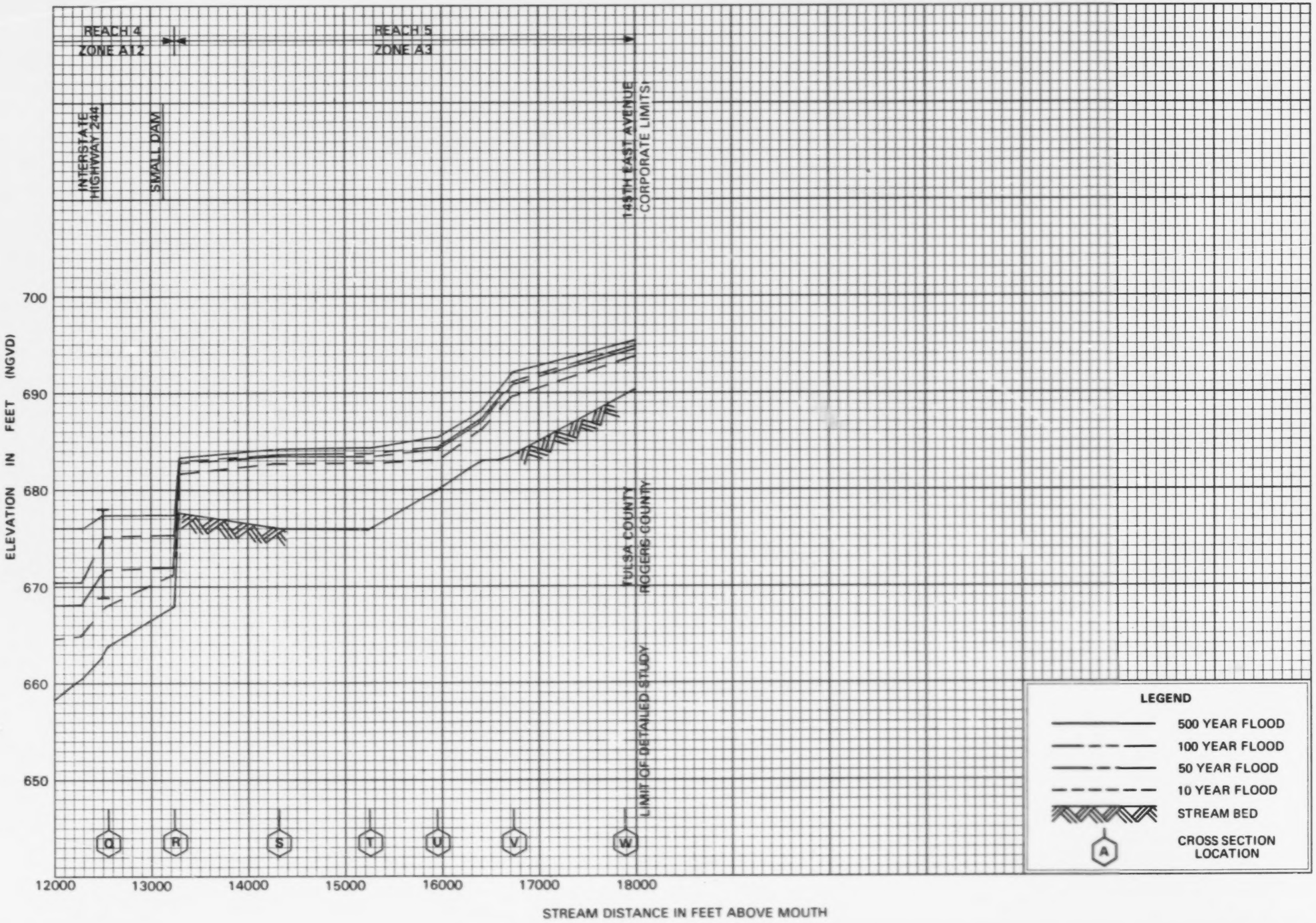

FLOOD PROFILES

COOLEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

46P

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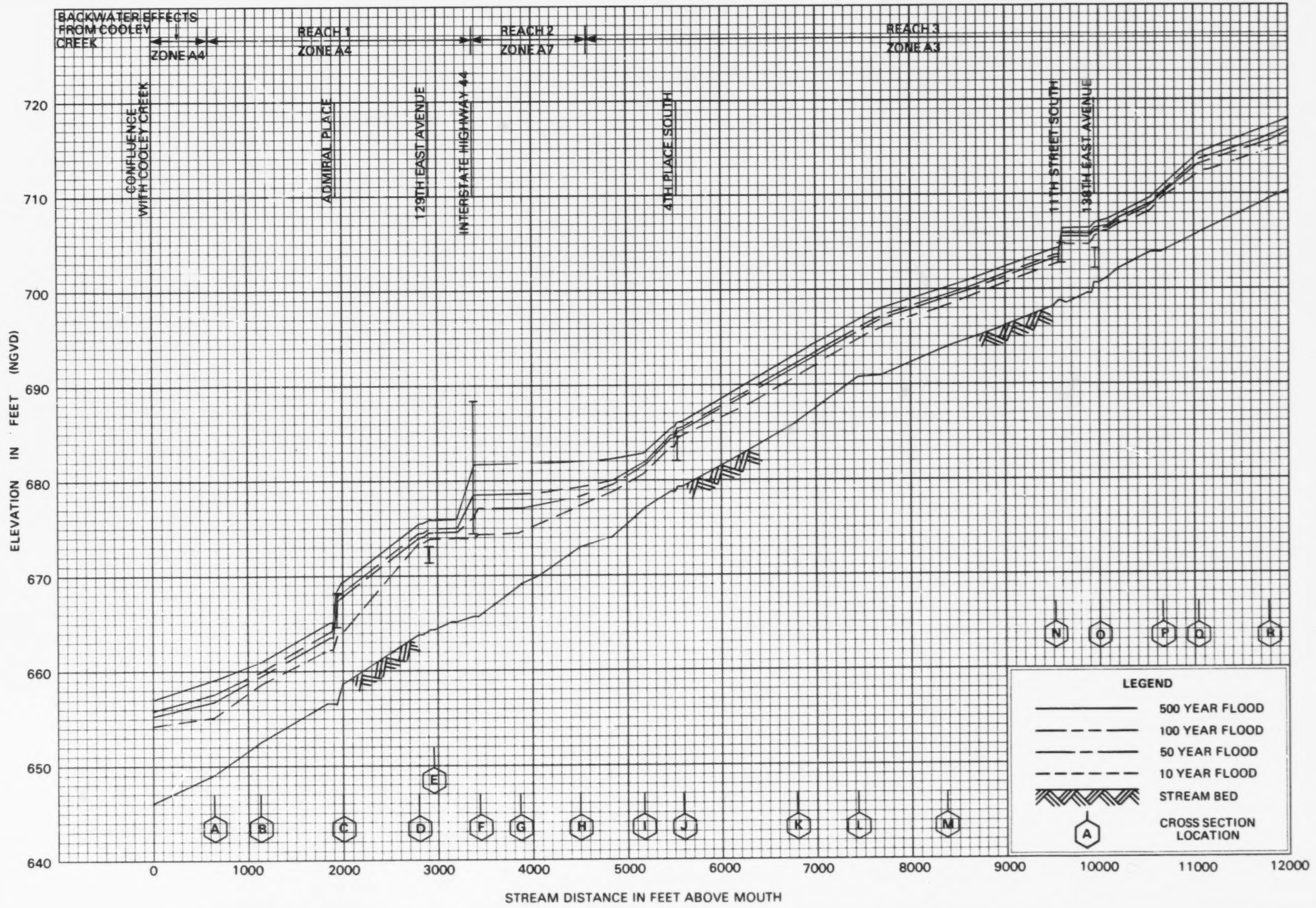

FLOOD PROFILES

COOLEY CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

47P

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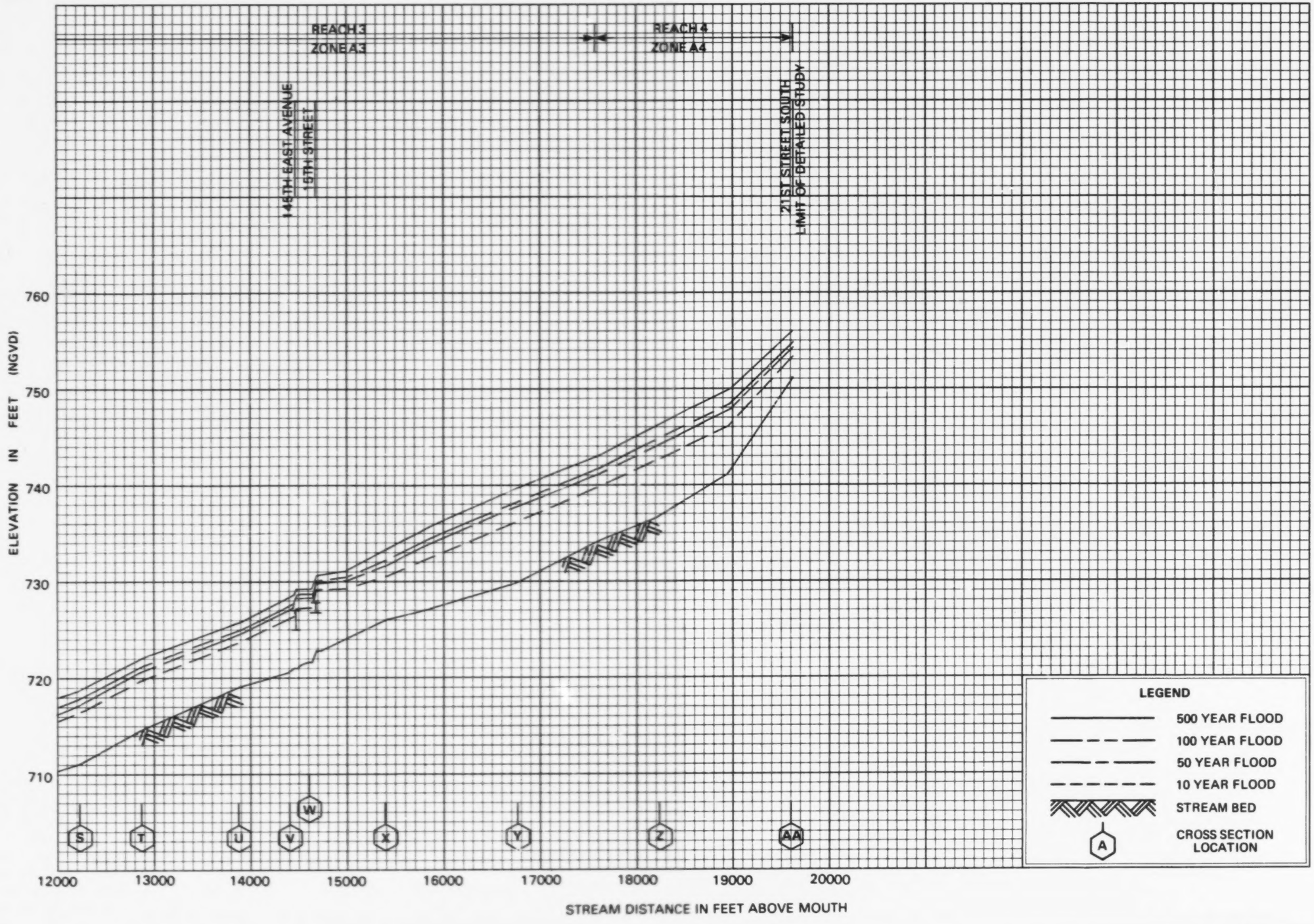


FLOOD PROFILES

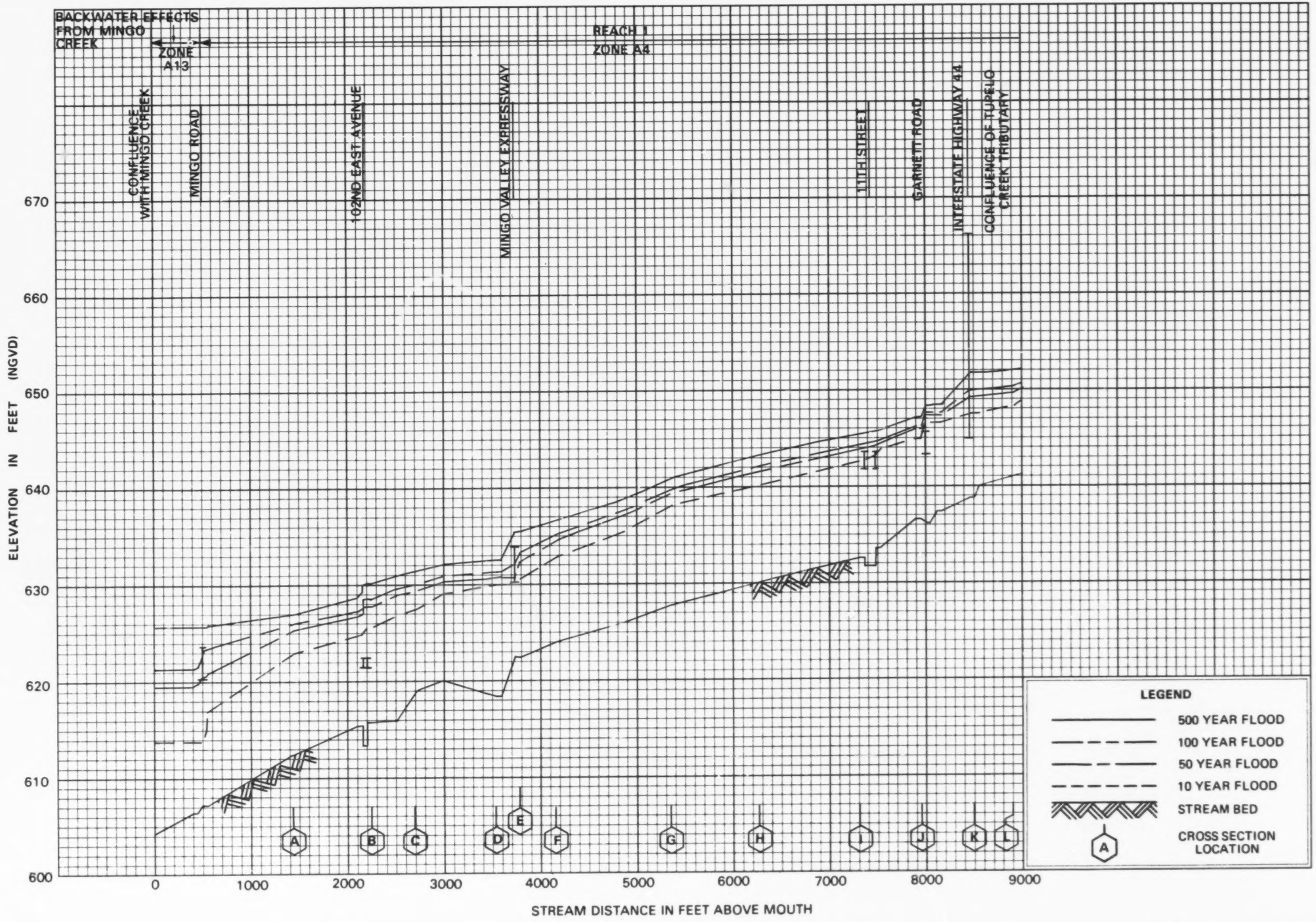
COOLEY CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

48P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

TUPELO CREEK

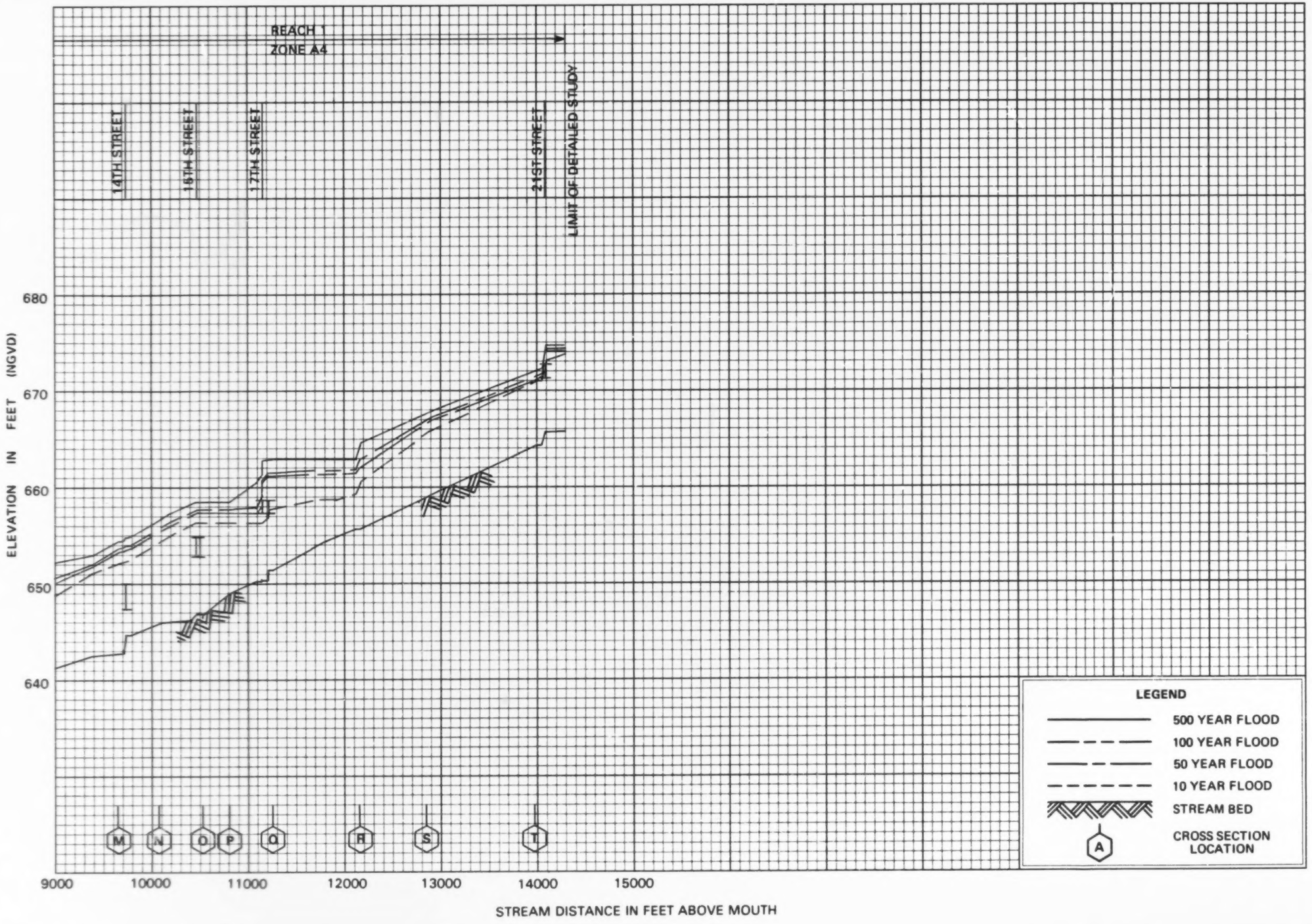
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

49P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

TUPELO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

50P

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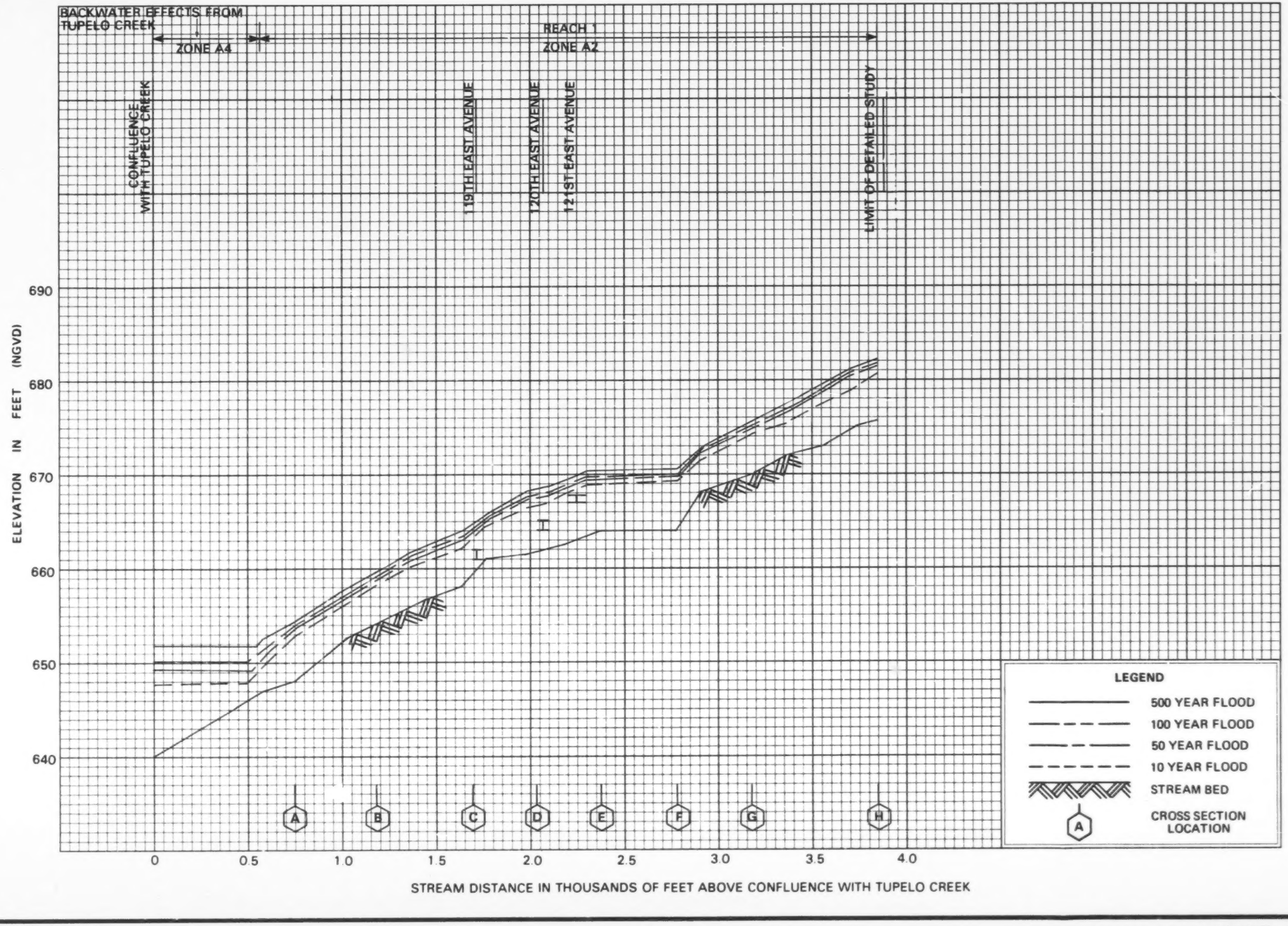


FLOOD PROFILES

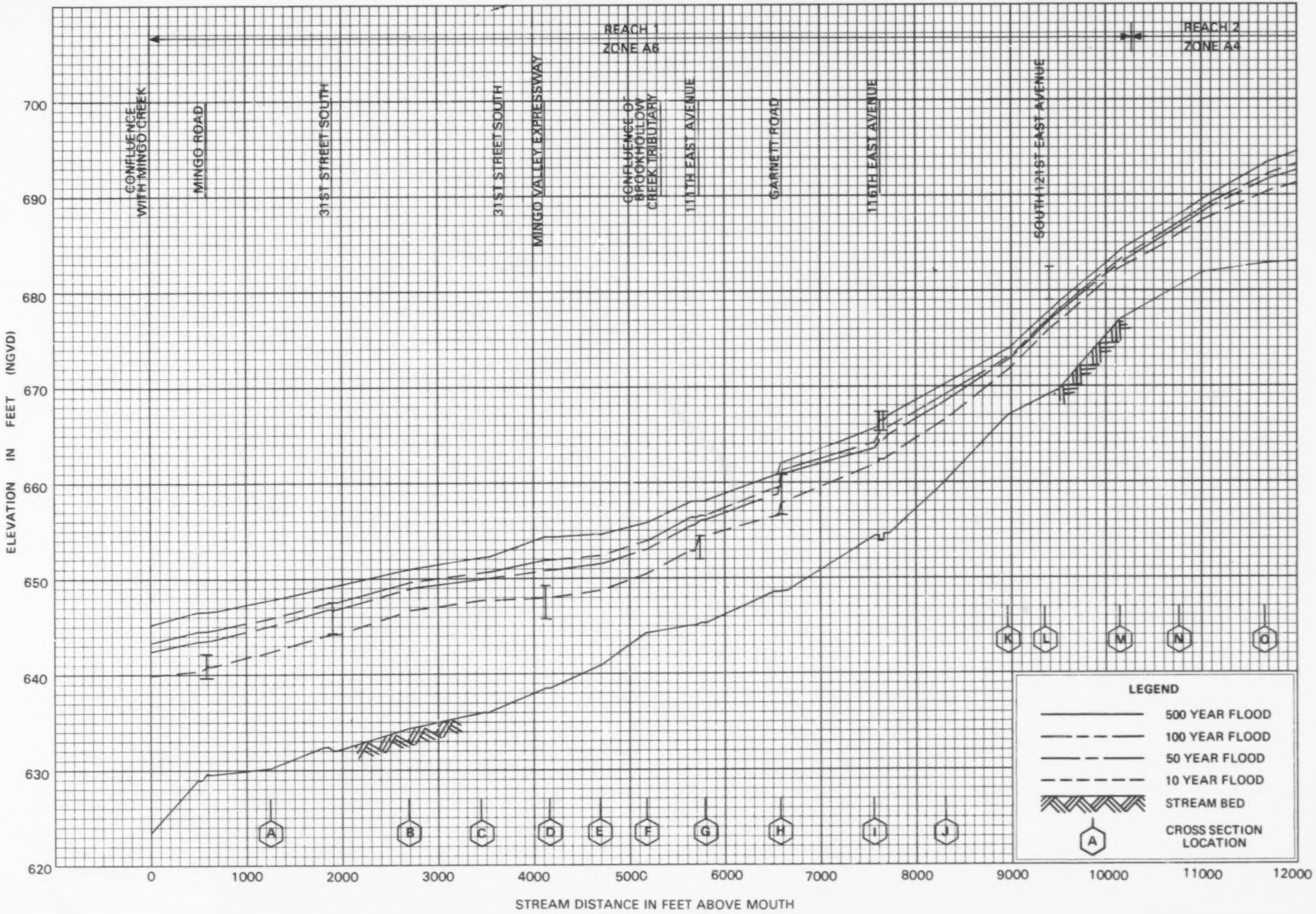
TUPELO CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

51P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

BROOKHOLLOW CREEK

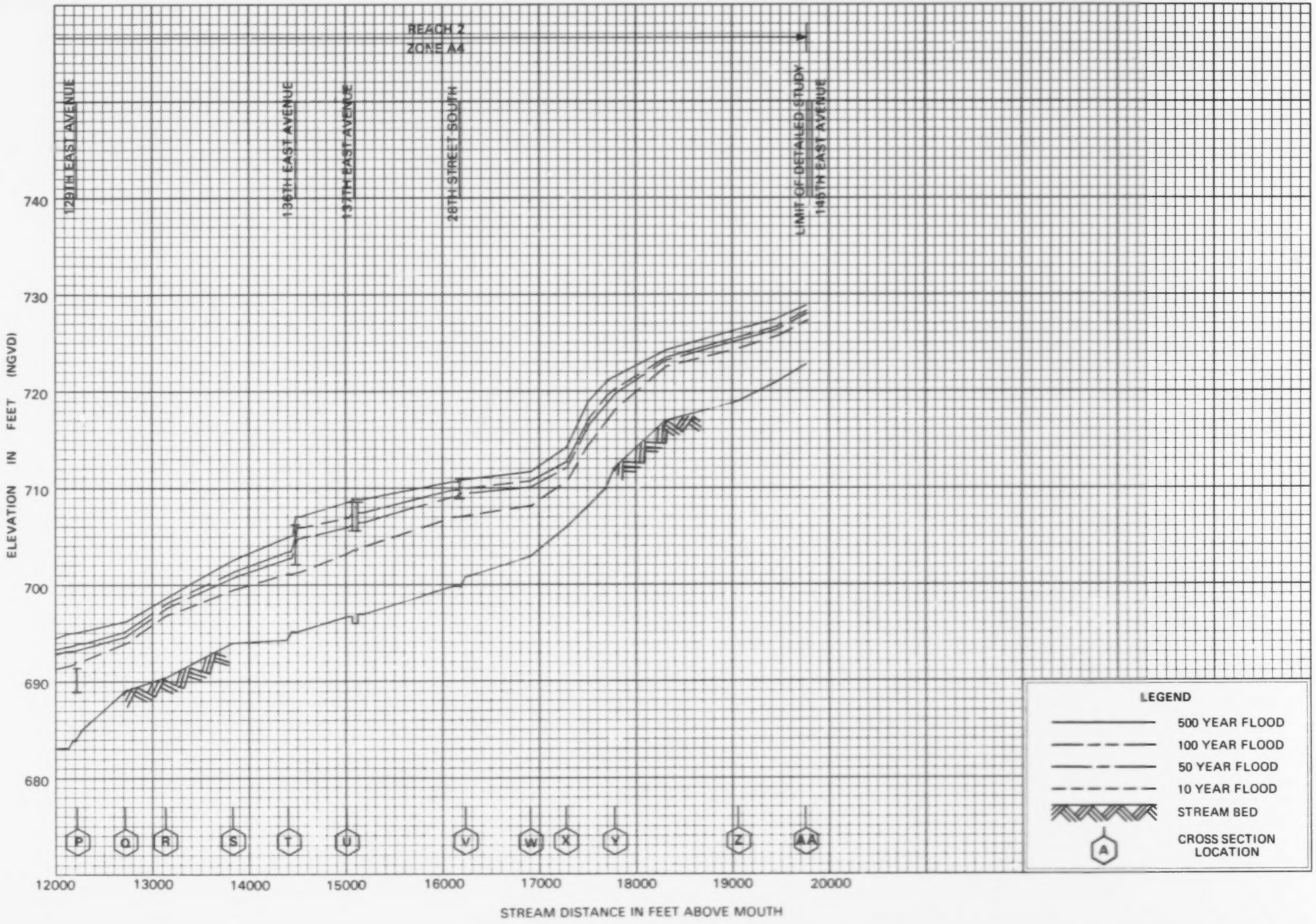
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

52P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

BROOKHOLLOW CREEK

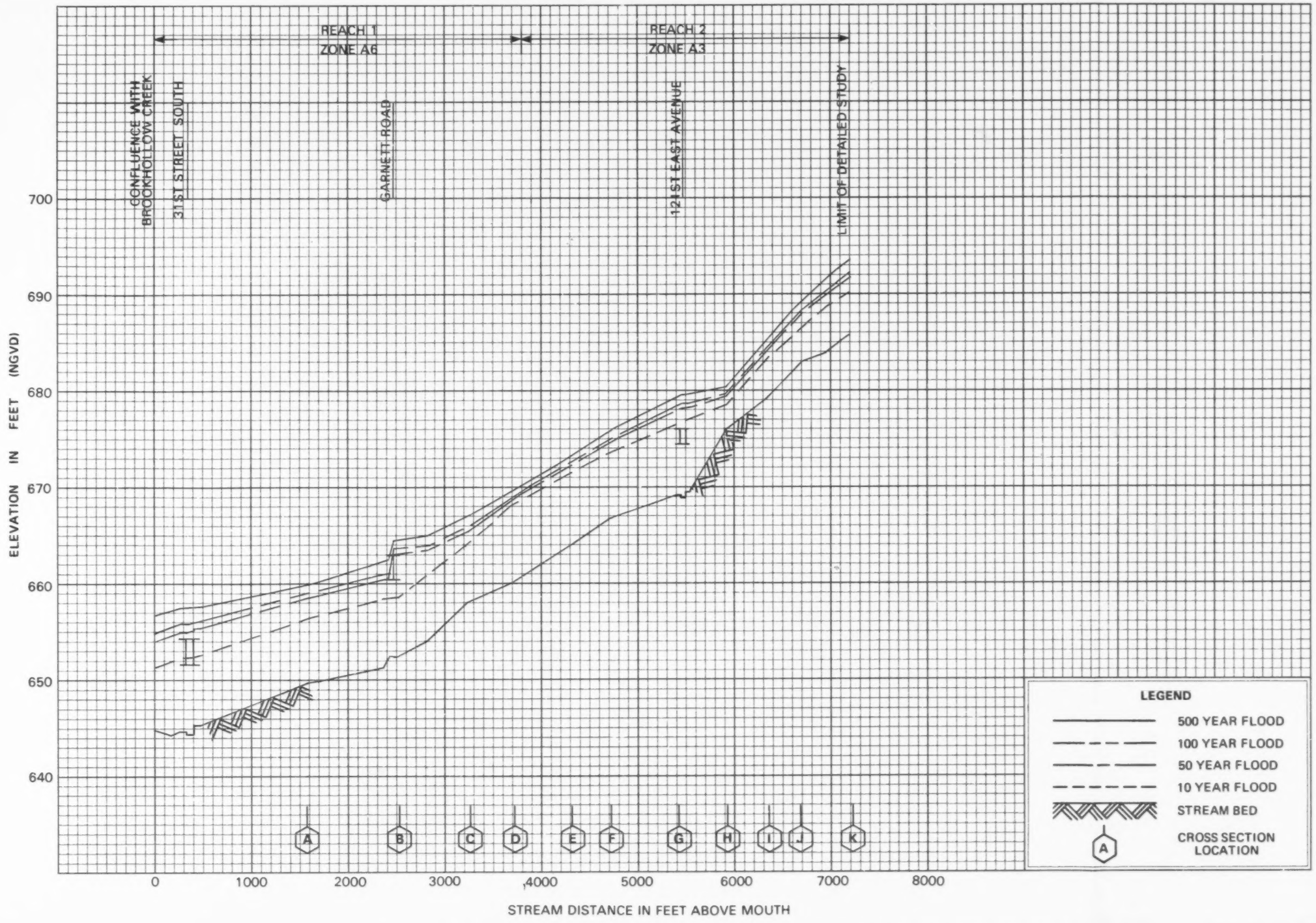
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

53P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

BROOKHOLLOW CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

54P

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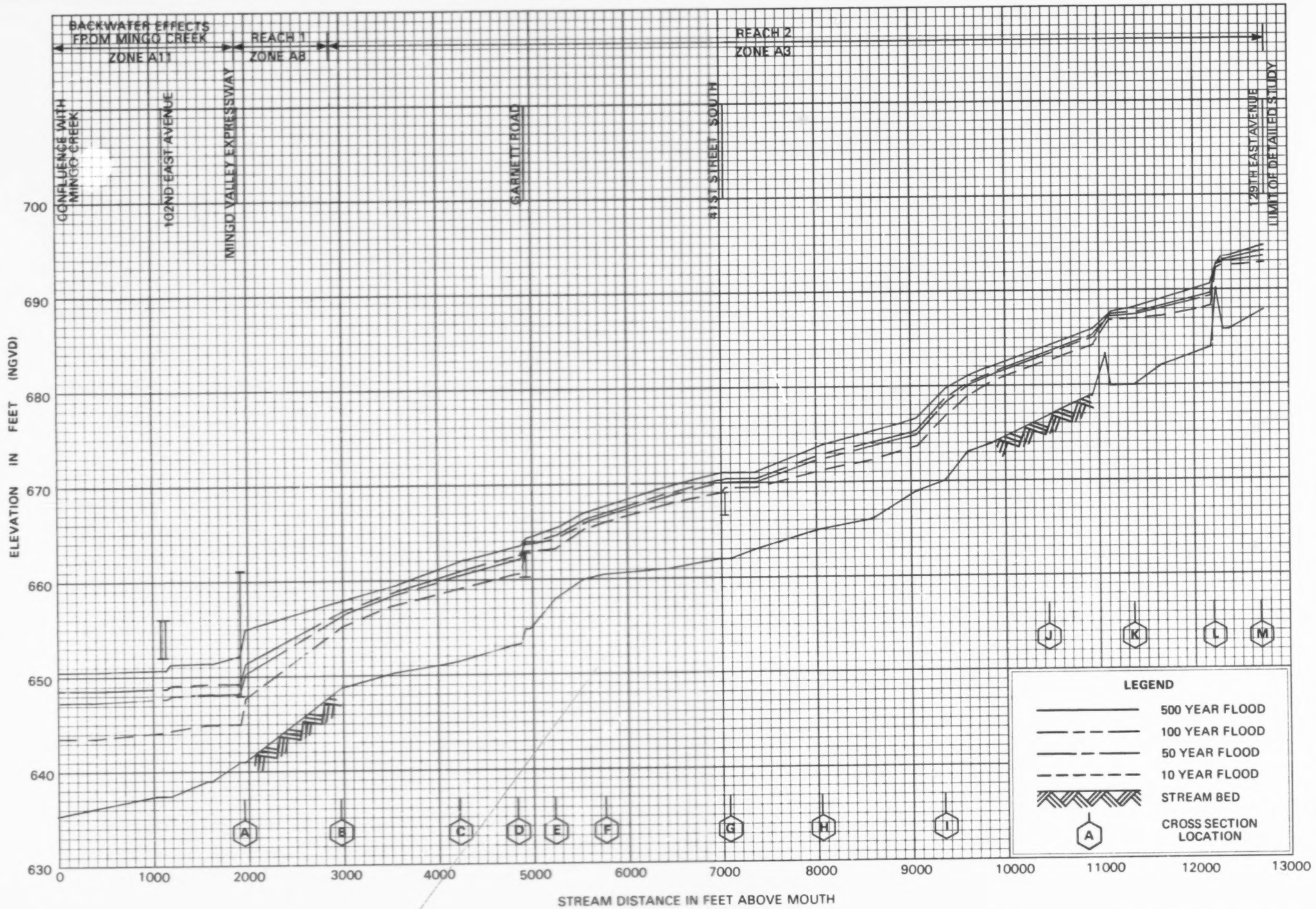

FLOOD PROFILES

SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

55P

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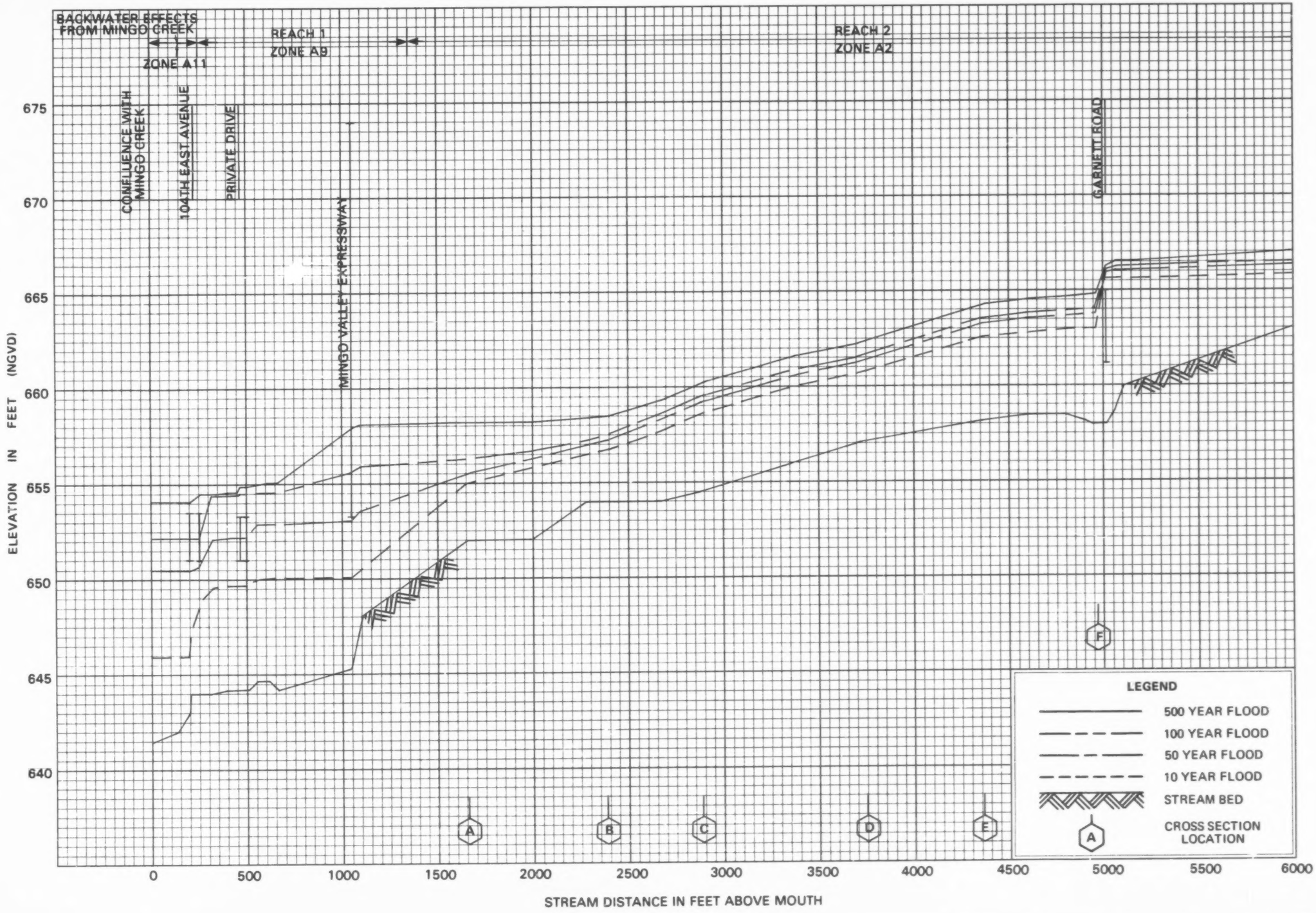

FLOOD PROFILES

SOUTHPARK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

56P

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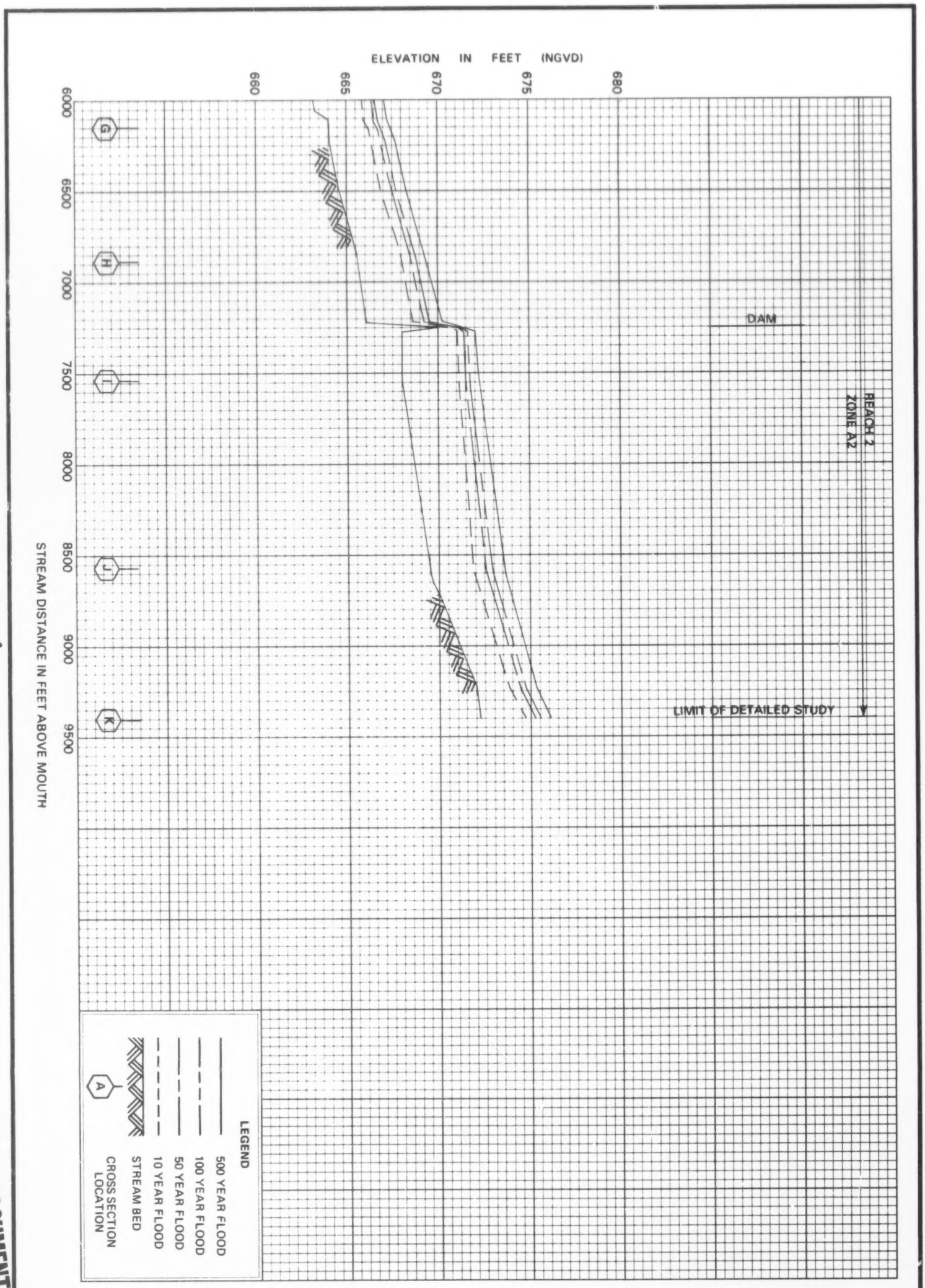


FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

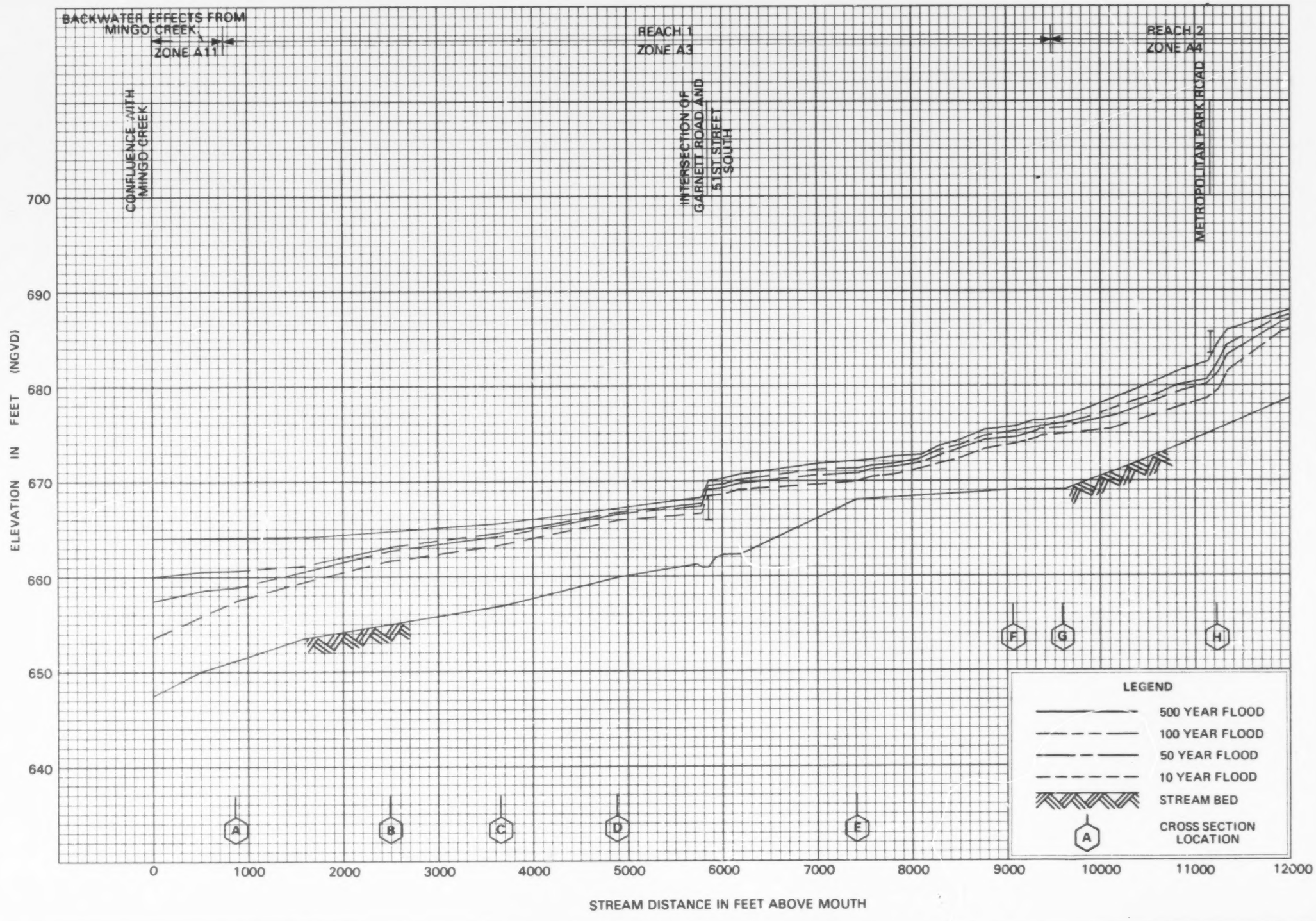
FLOOD PROFILES

SOUTHPARK CREEK

57P

149

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

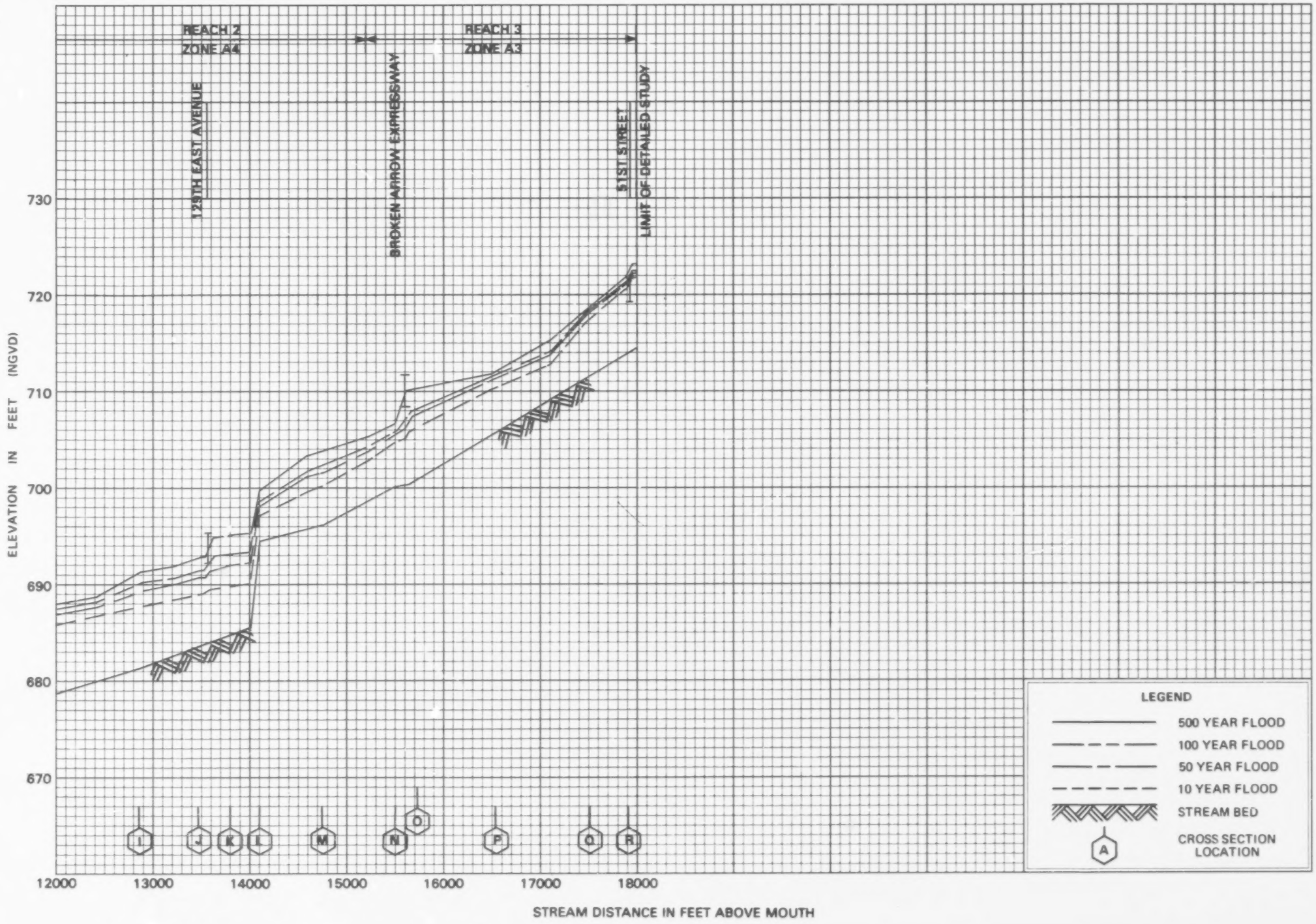
FORD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

58P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

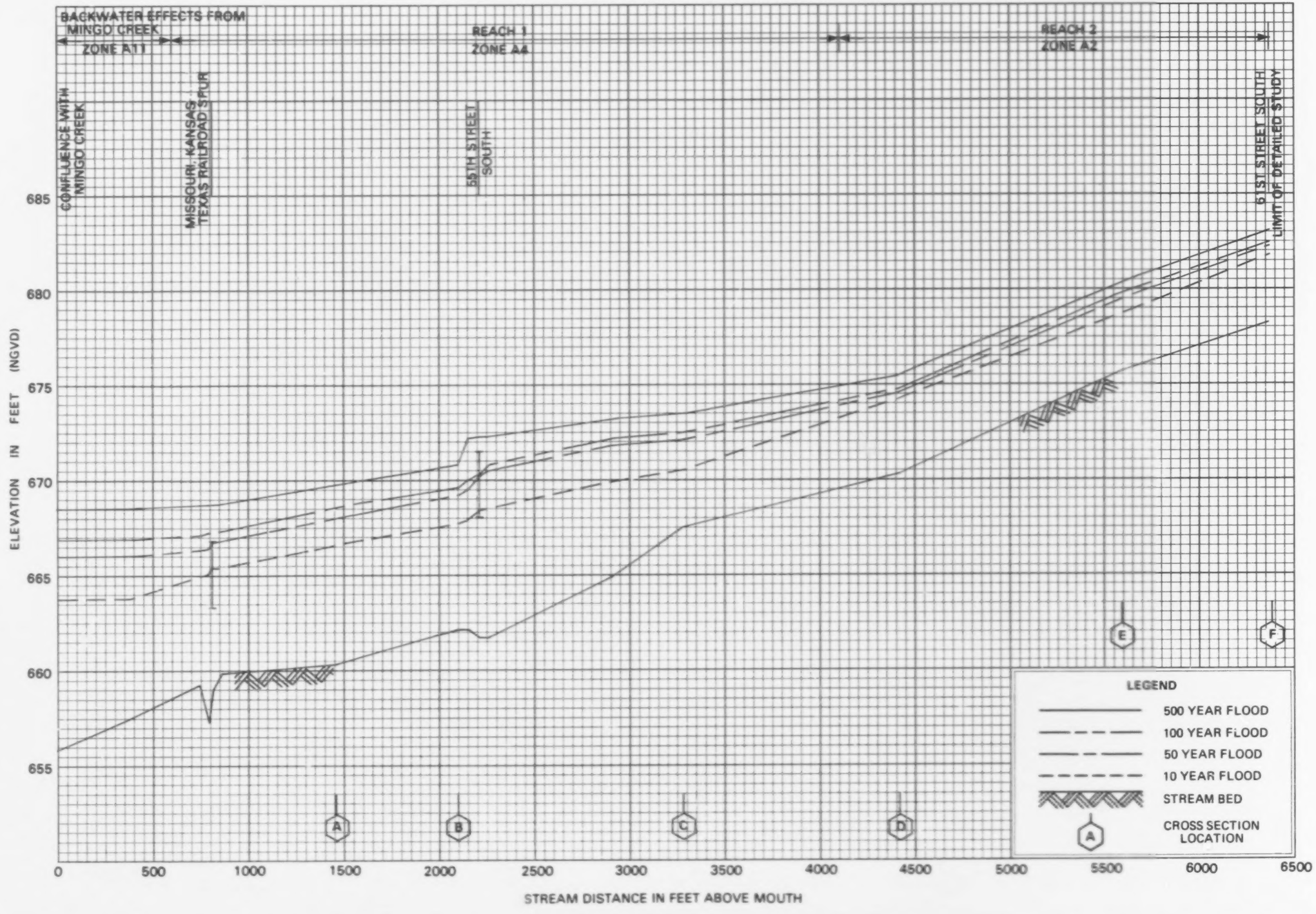
FORD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

59P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

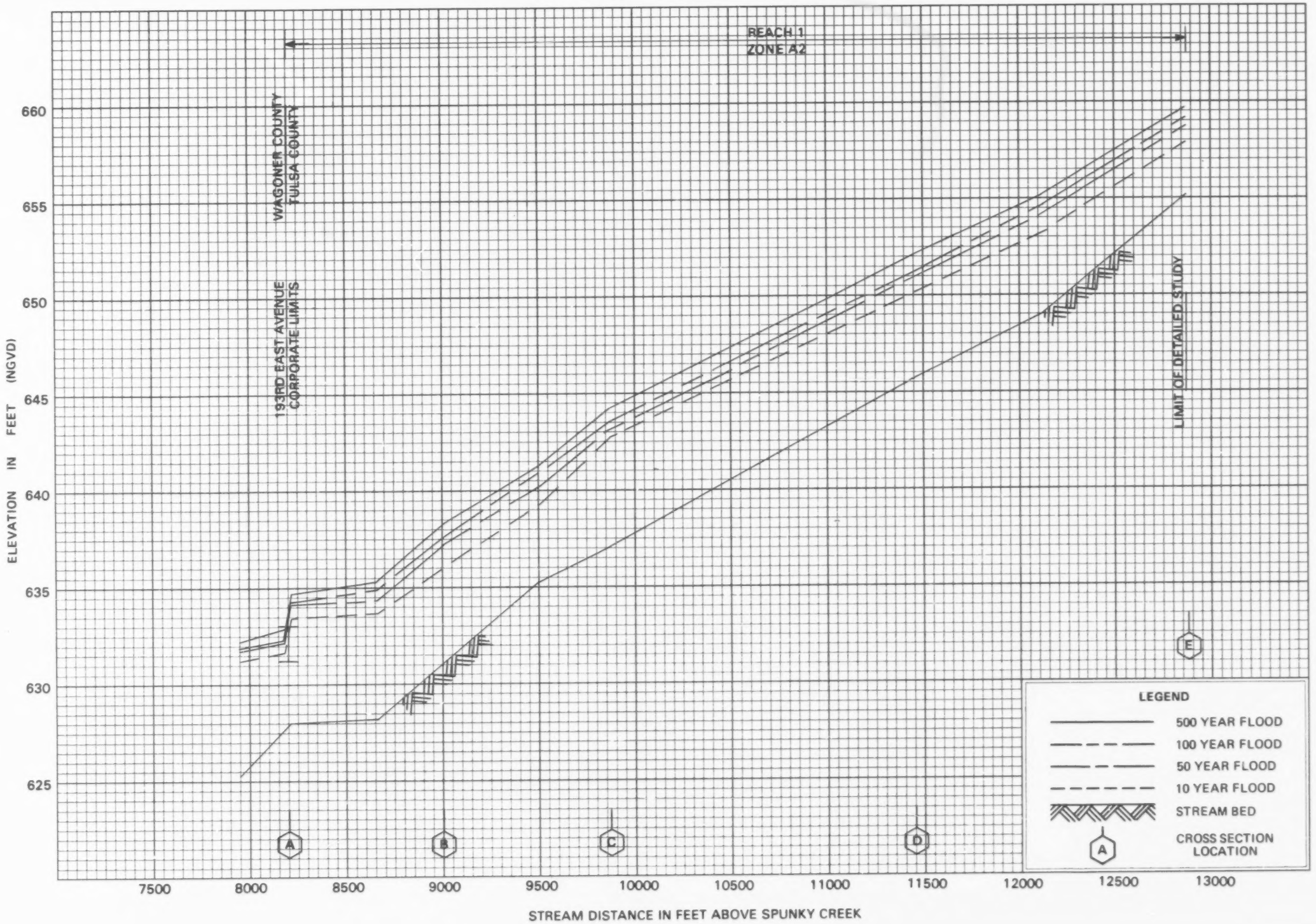
CATFISH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

60P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

SPUNKY CREEK TRIBUTARY A

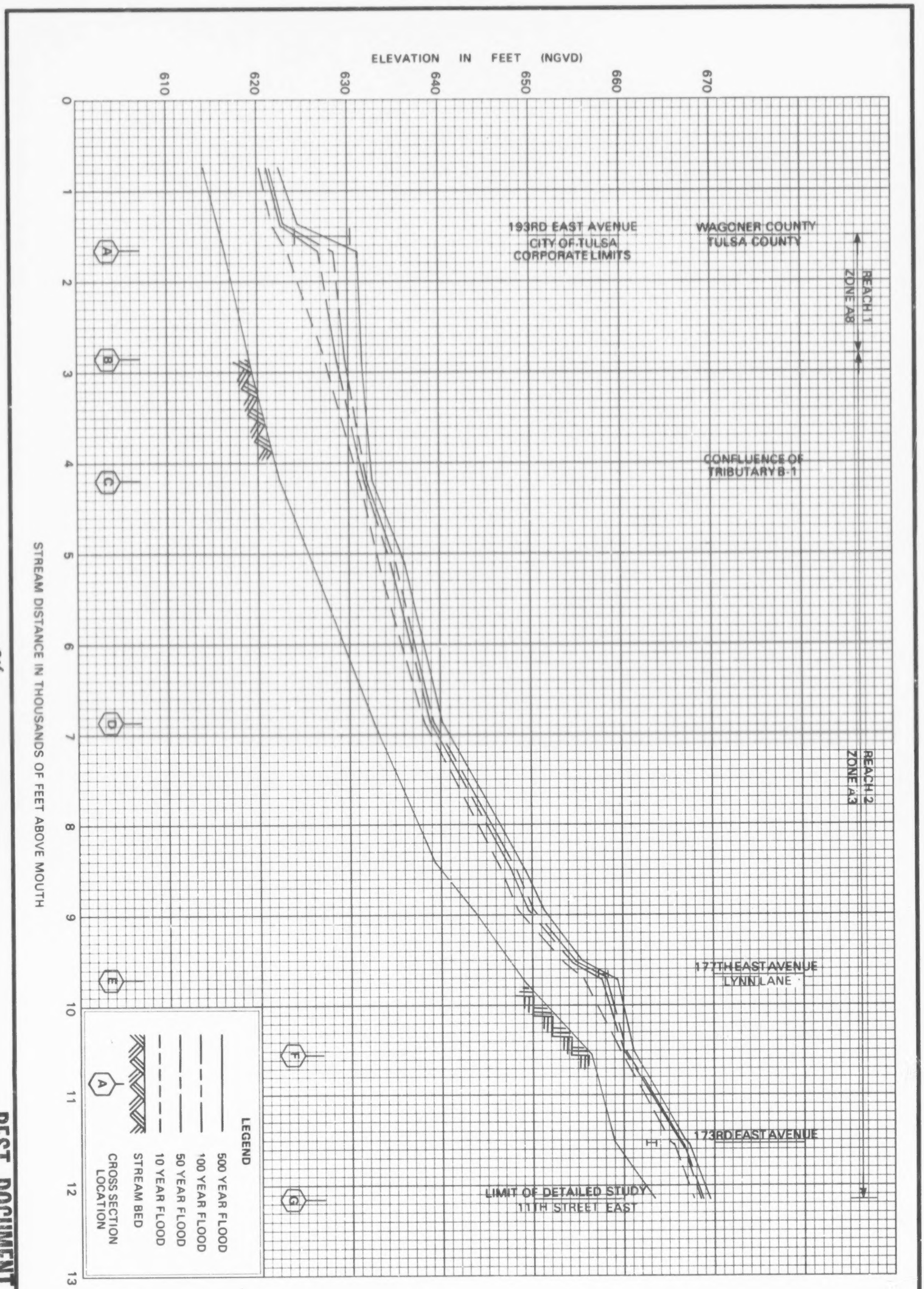
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

61P

BEST DOCUMENT AVAILABLE



154

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

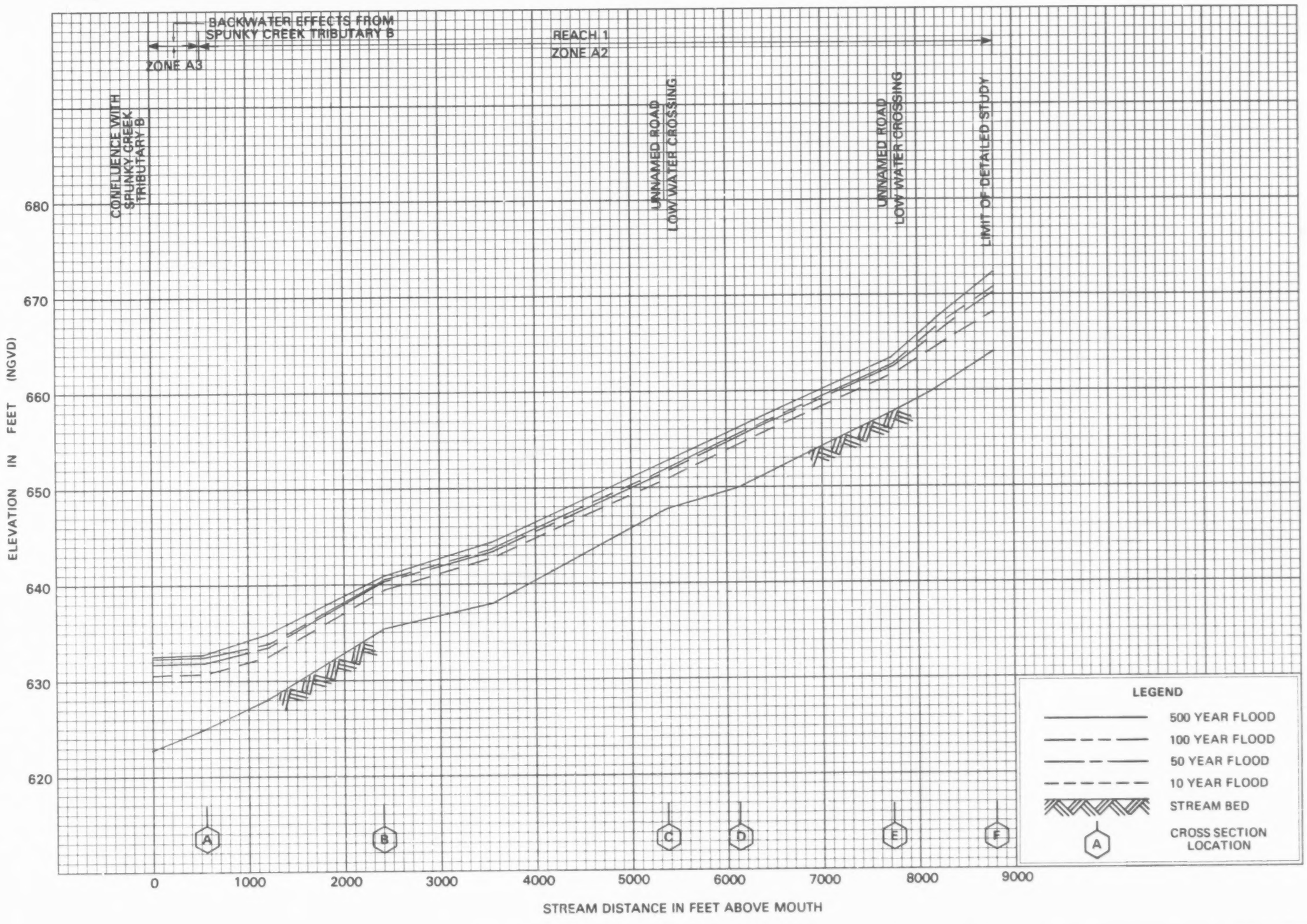
(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

SPUNKY CREEK TRIBUTARY B

62P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

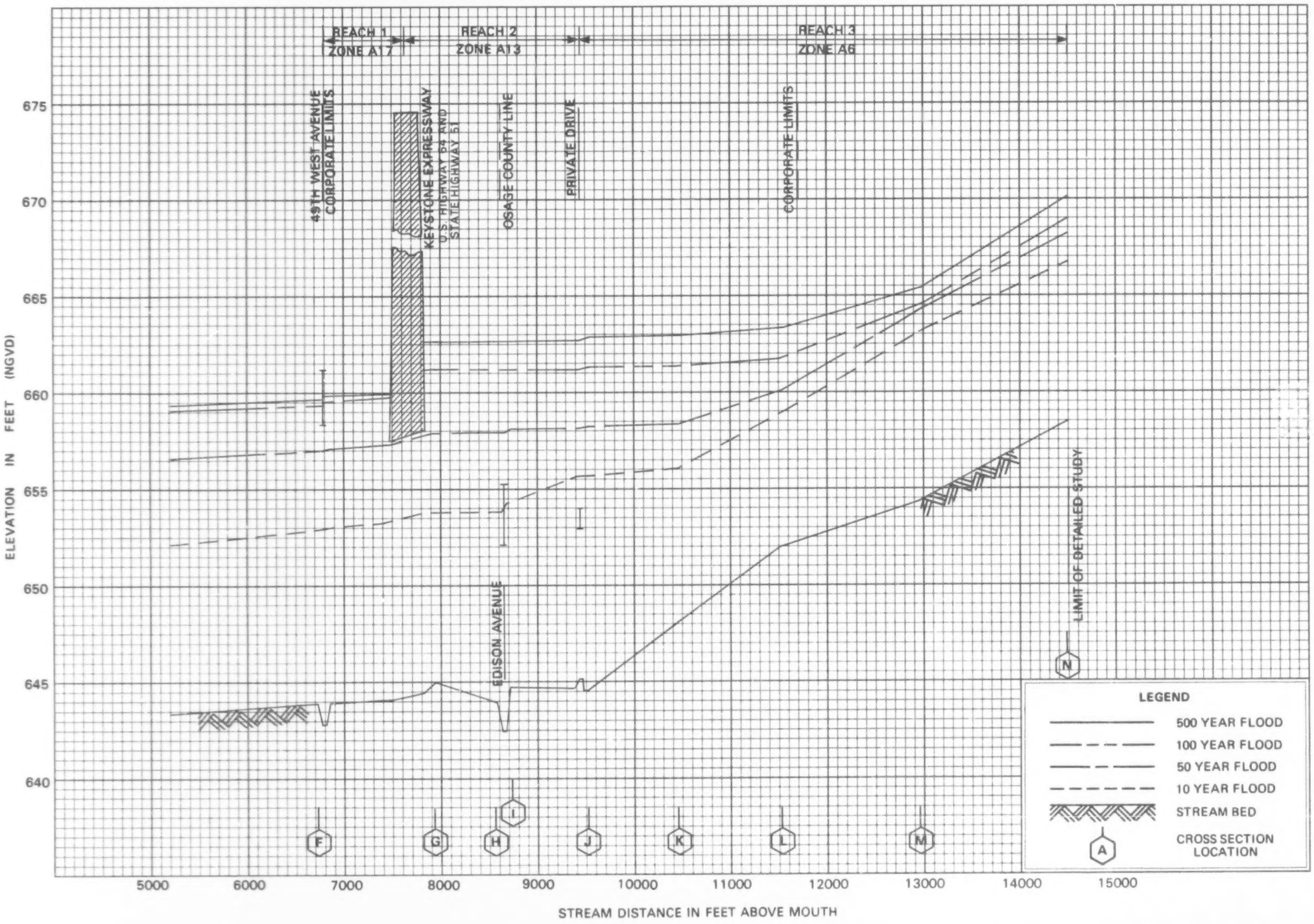
SPUNKY CREEK TRIBUTARY B-1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

63P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

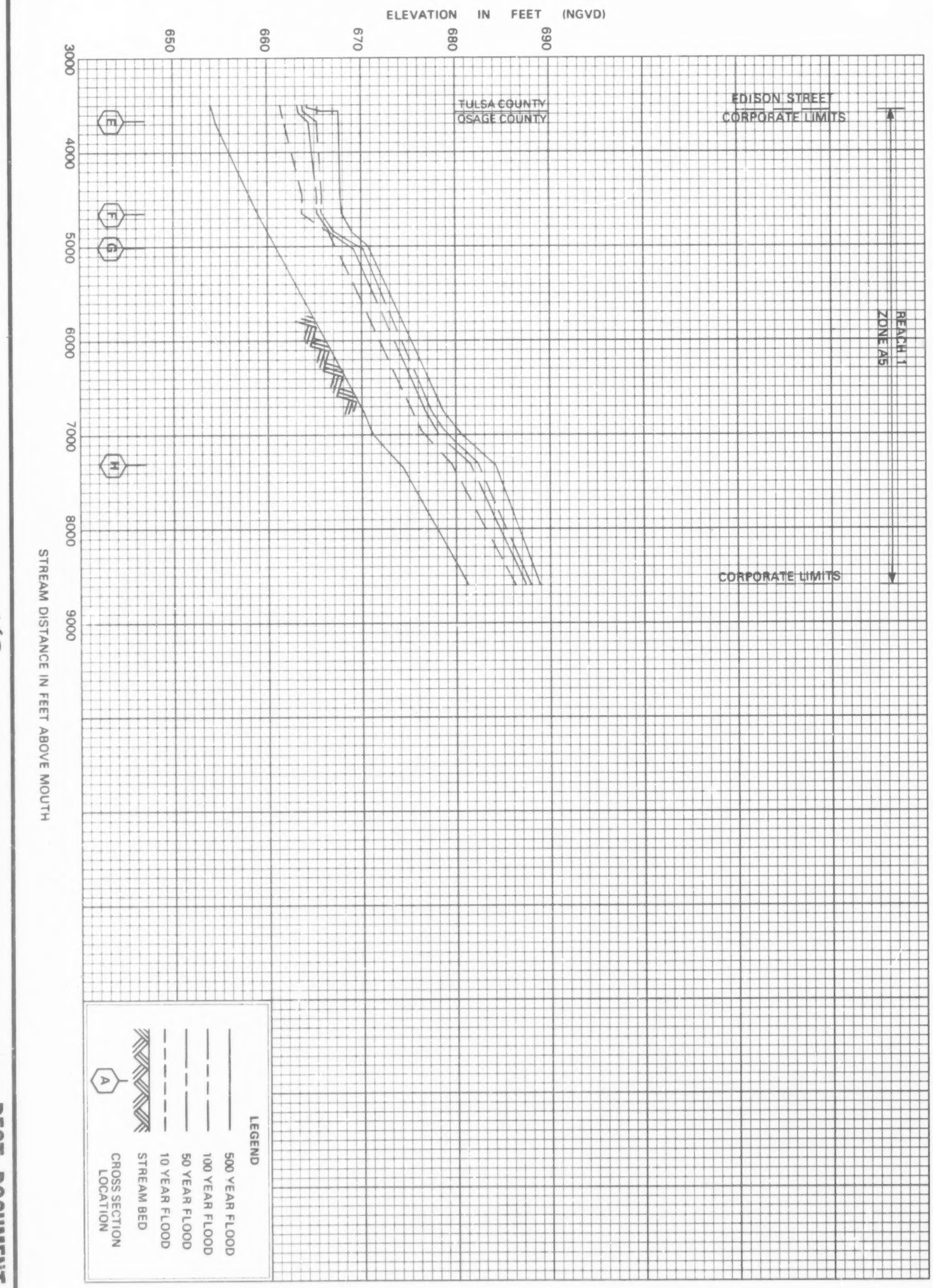
HARLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

64P

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

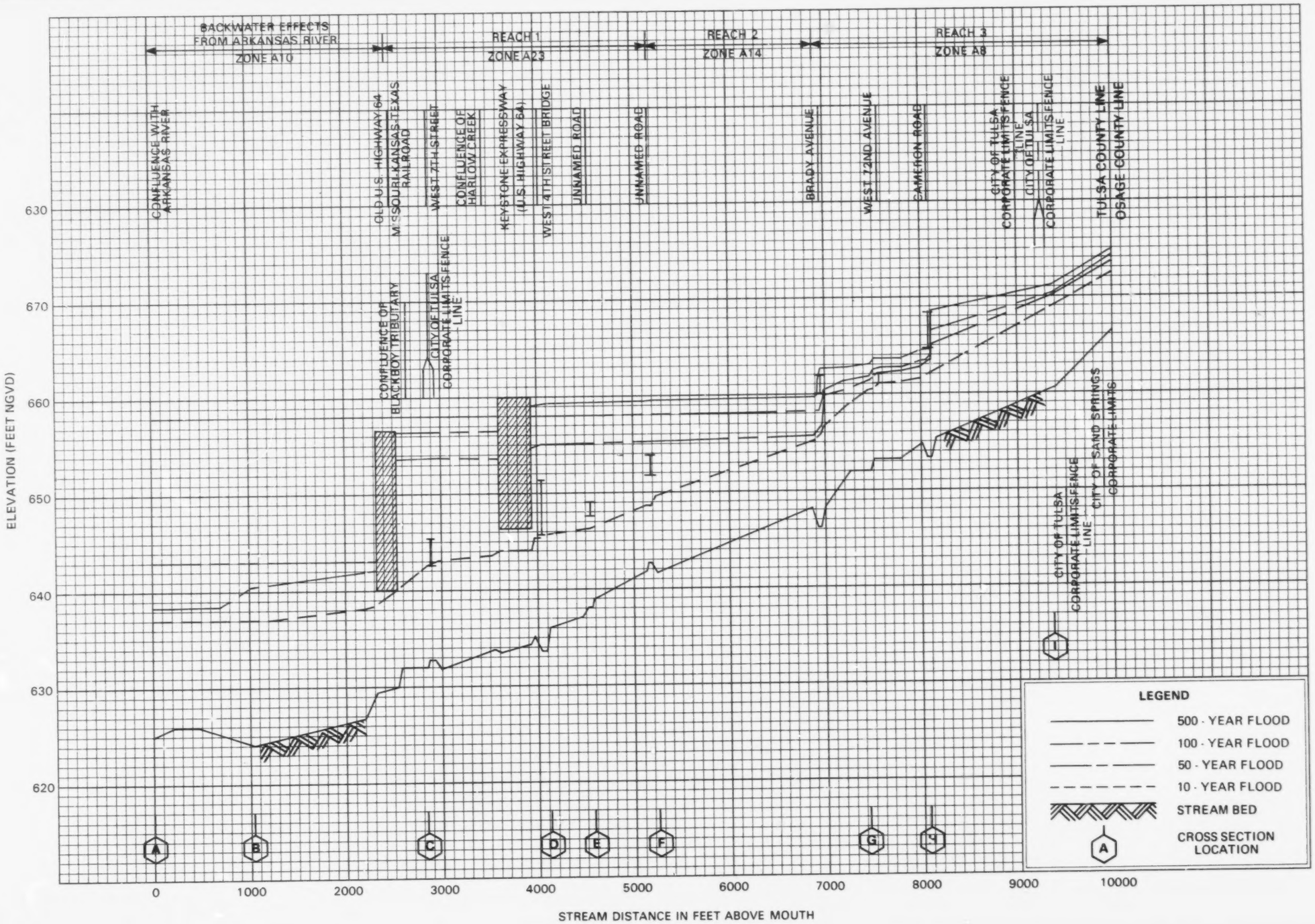
FLOOD PROFILES

HARLOW CREEK TRIBUTARY

65P

157

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

BLACKBOY CREEK

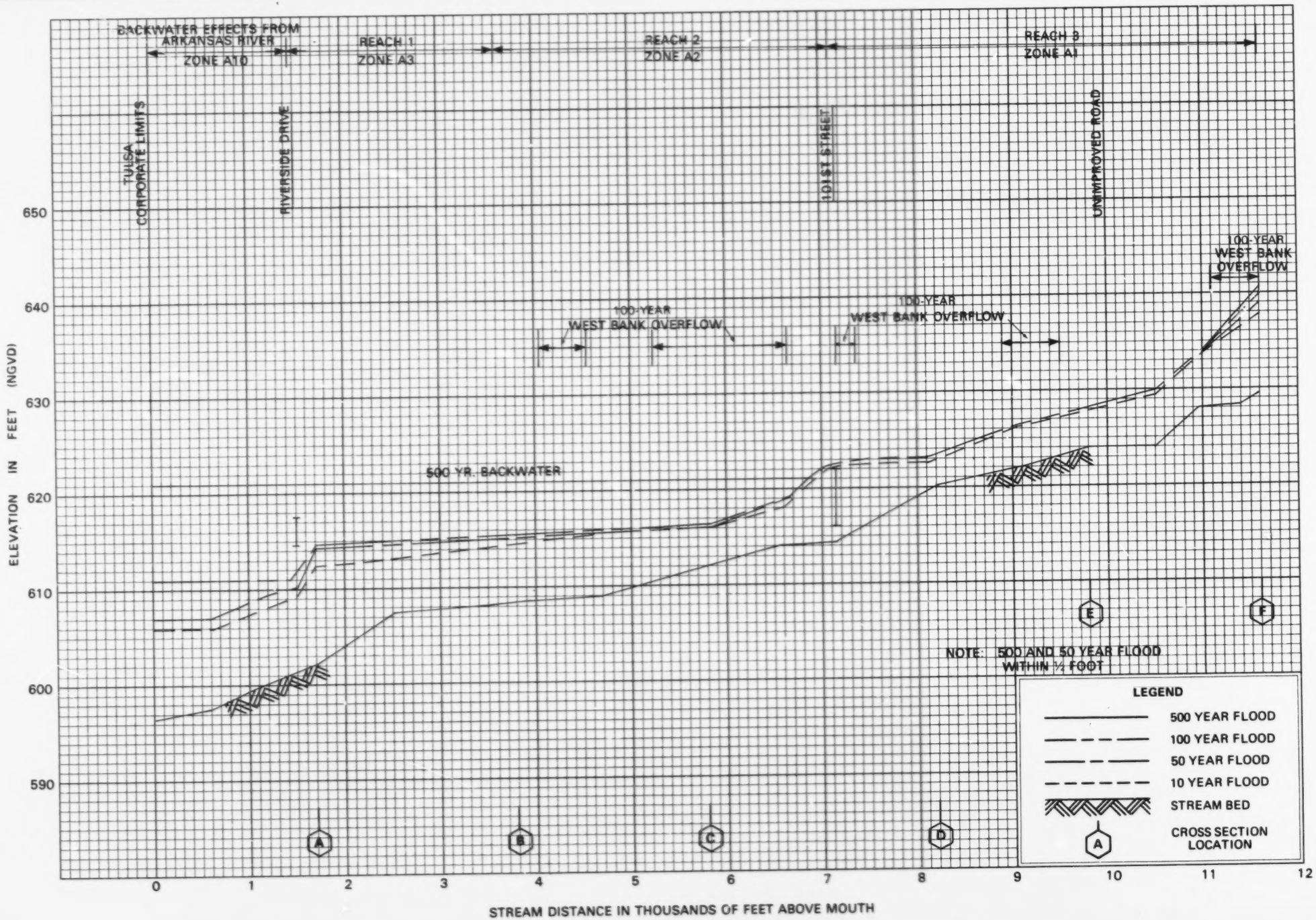
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

66P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

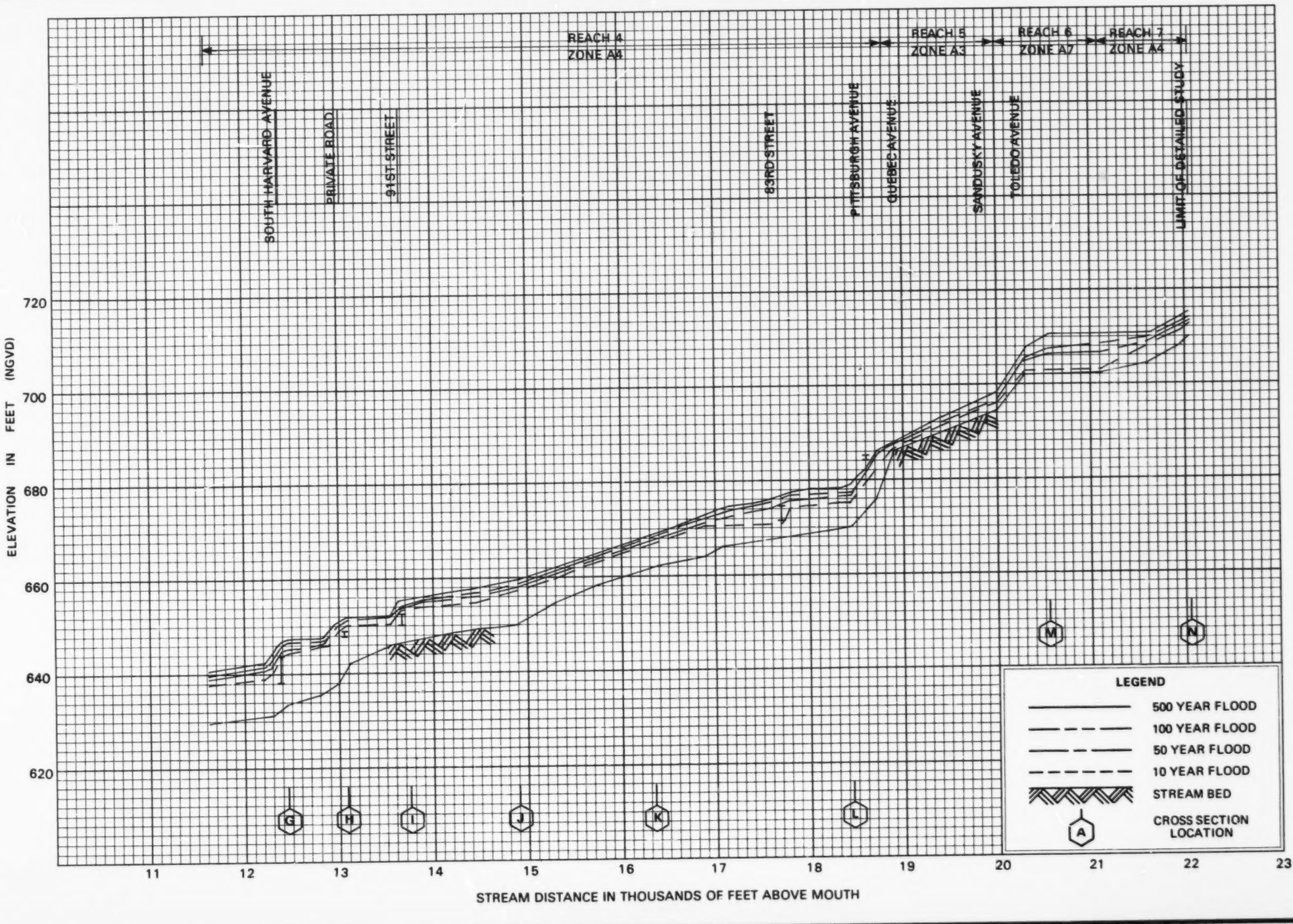
VENSEL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

67P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

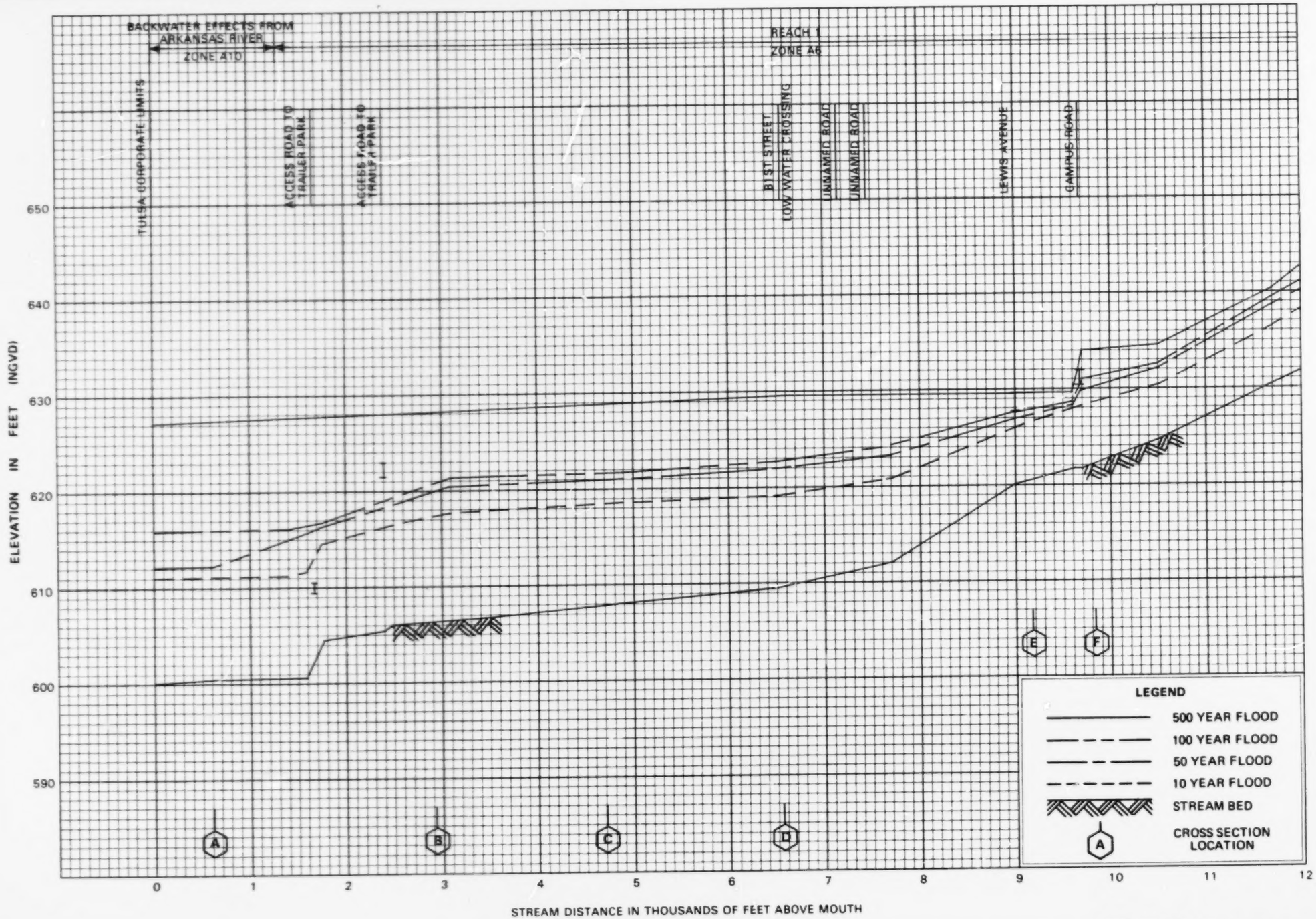
VENSEL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

68P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

FRED CREEK

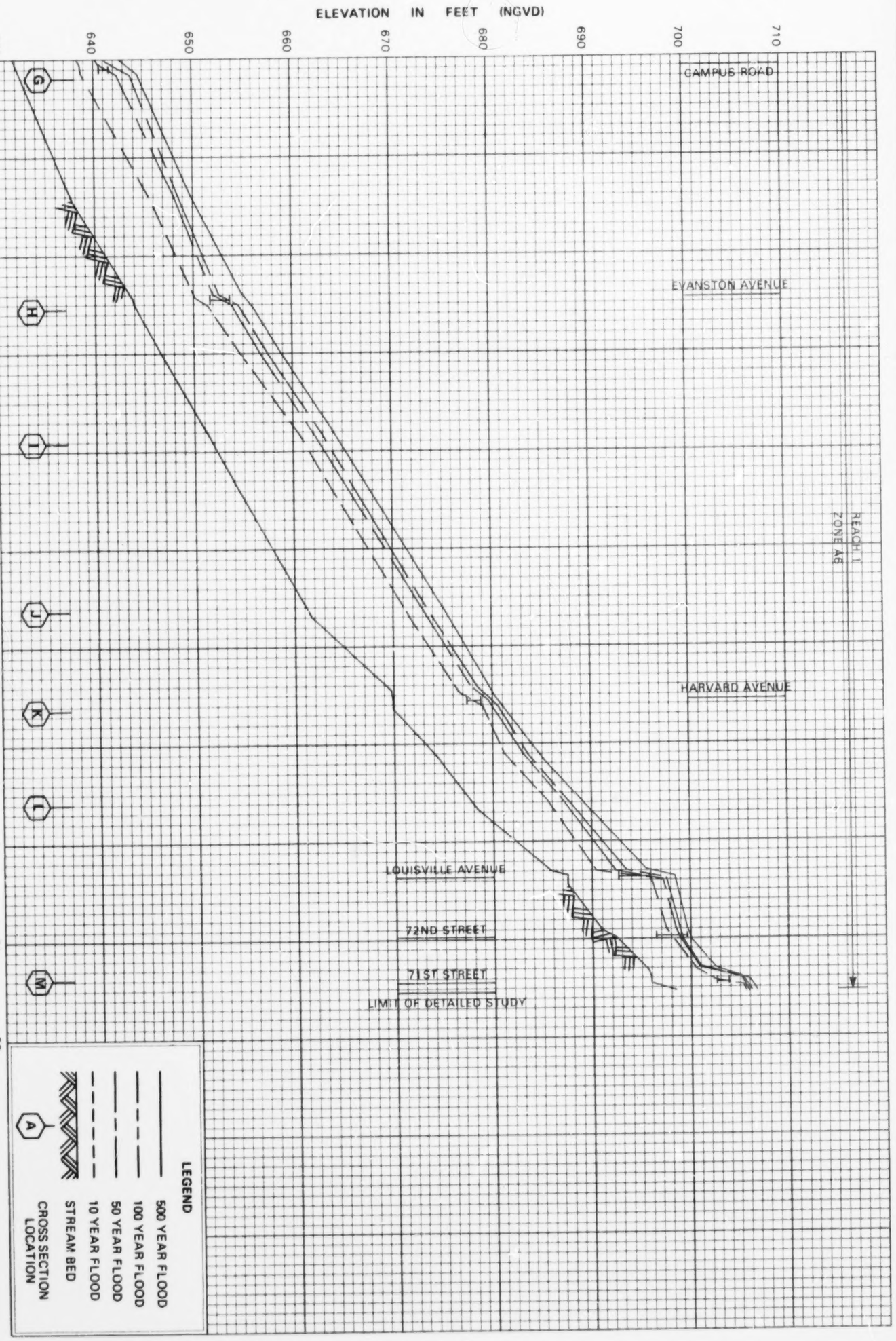
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

69P

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

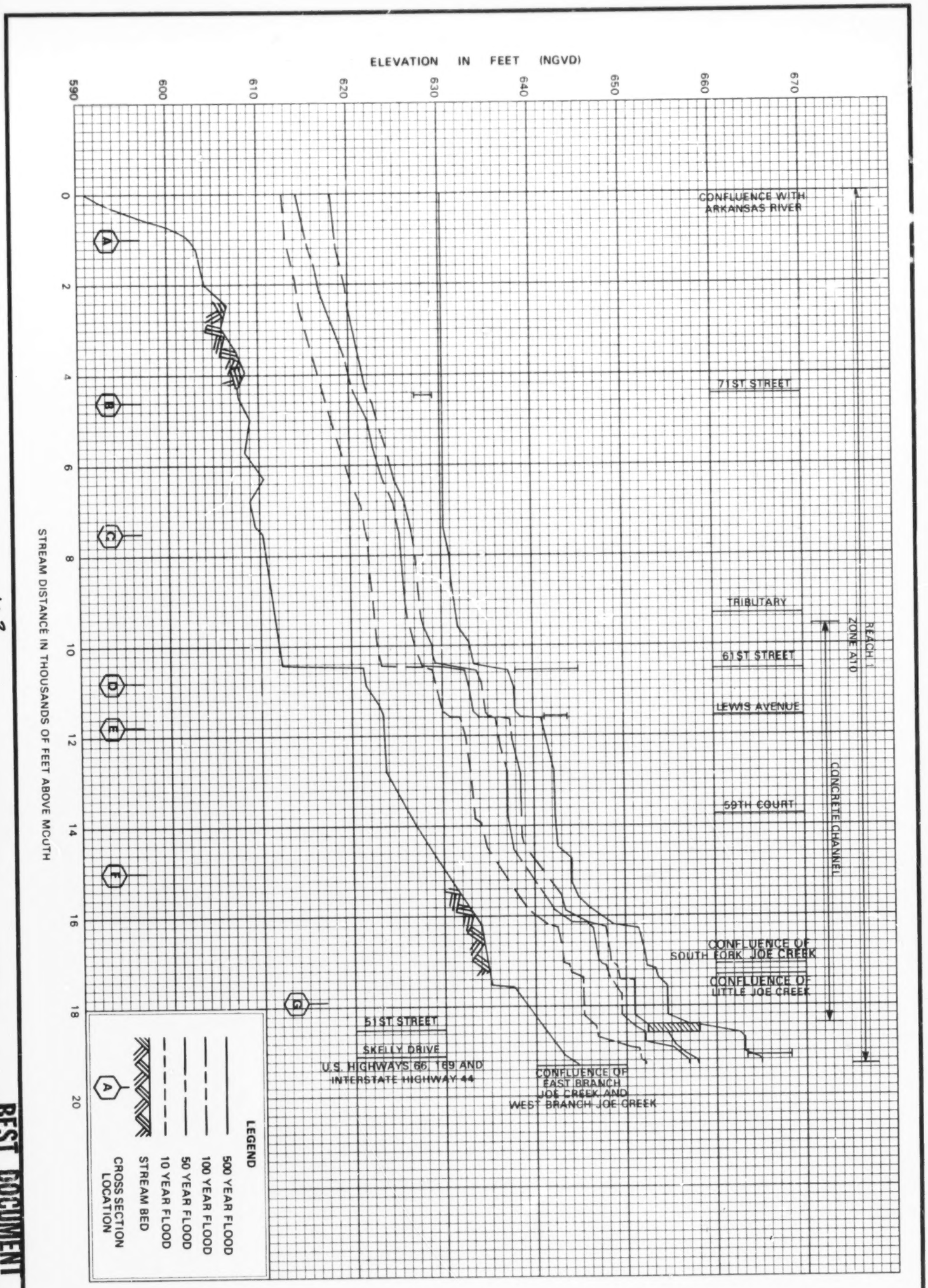
(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

FRED CREEK

70P

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

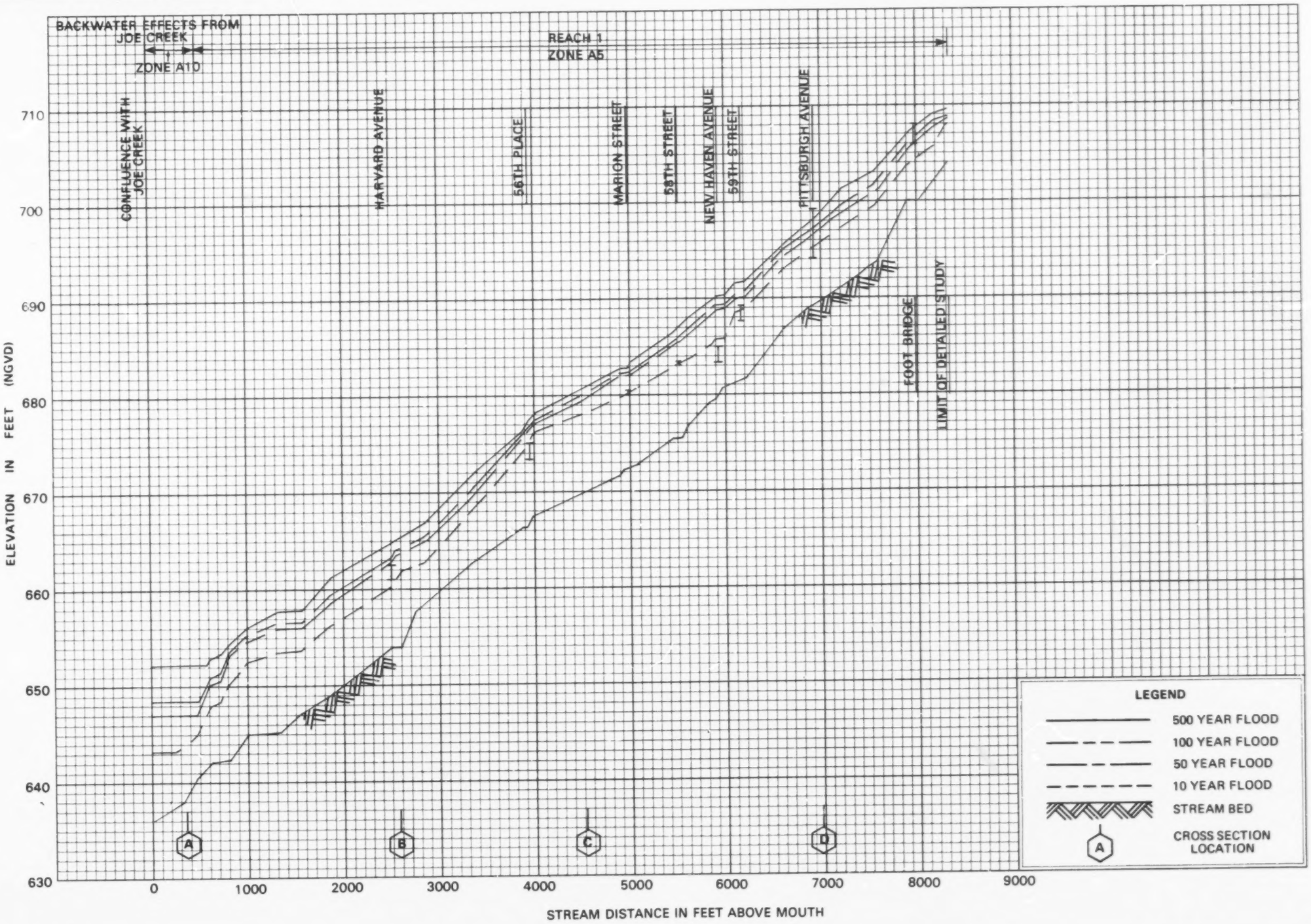
FLOOD PROFILES

JOE CREEK

71P

163

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

SOUTH FORK JOE CREEK

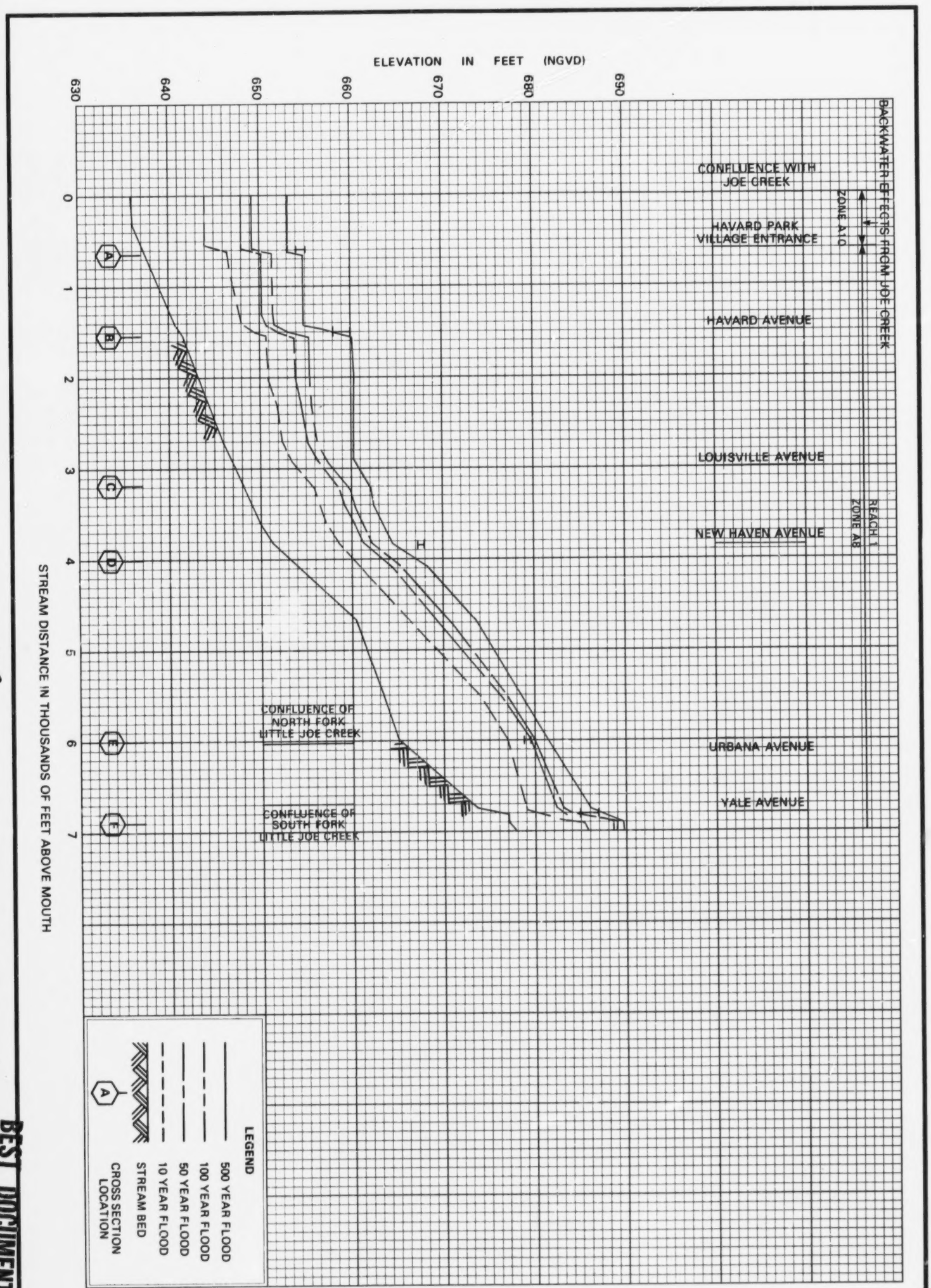
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

72P

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

73P

FLOOD PROFILES

LITTLE JOE CREEK

BEST DOCUMENT AVAILABLE

REACH 1
ZONE A8

REACH 2
ZONE A2

REACH 3
ZONE A10

HUDSON AVENUE

JOPLIN AVENUE

UNNAMED ROAD

SHERIDAN ROAD
LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NGVD)

730
720
710
700
690
680
670

7 8 9 10 11 12 13 14

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE MOUTH

G H I J

LEGEND

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
A — CROSS SECTION LOCATION

FLOOD PROFILES

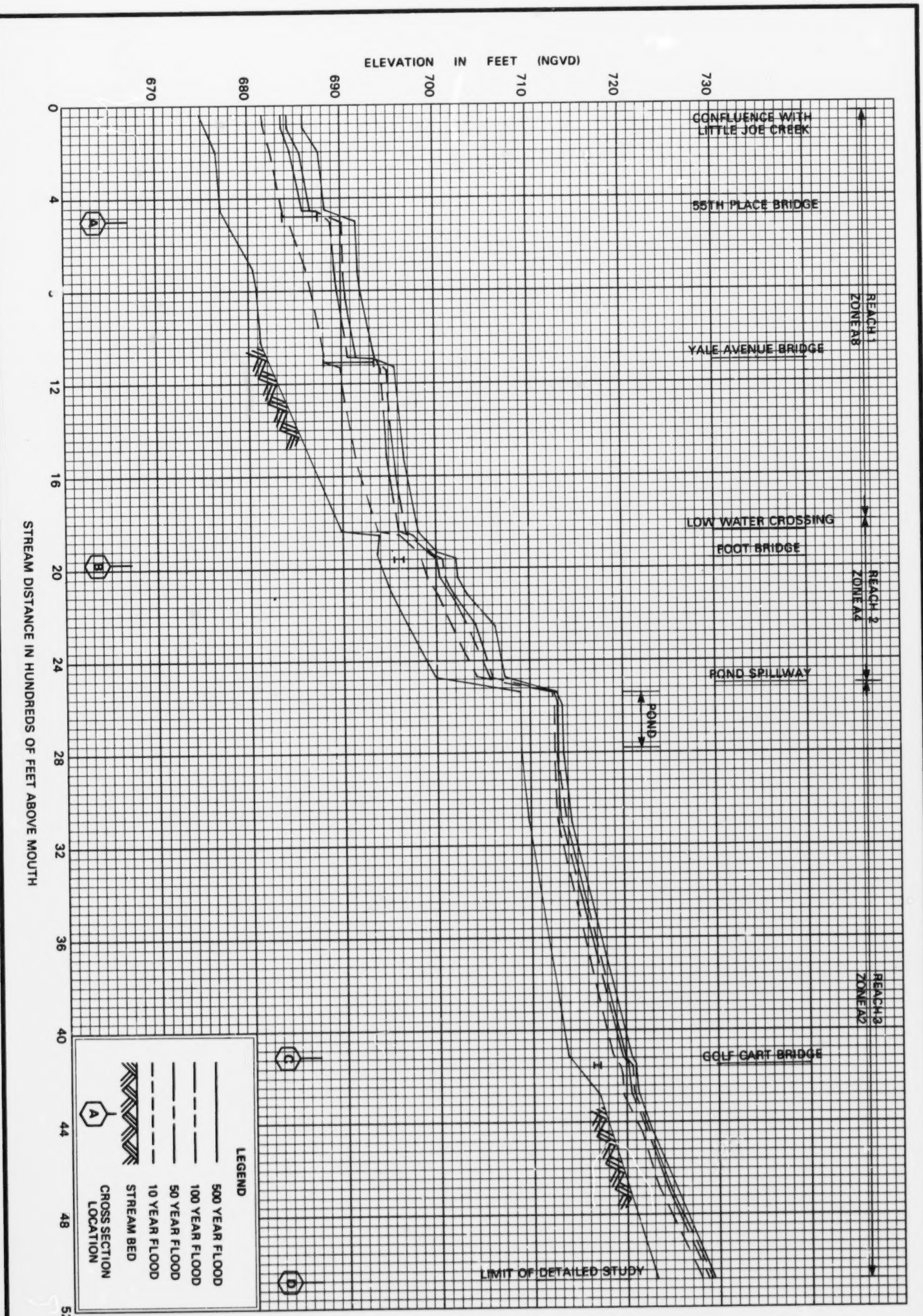
LITTLE JOE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

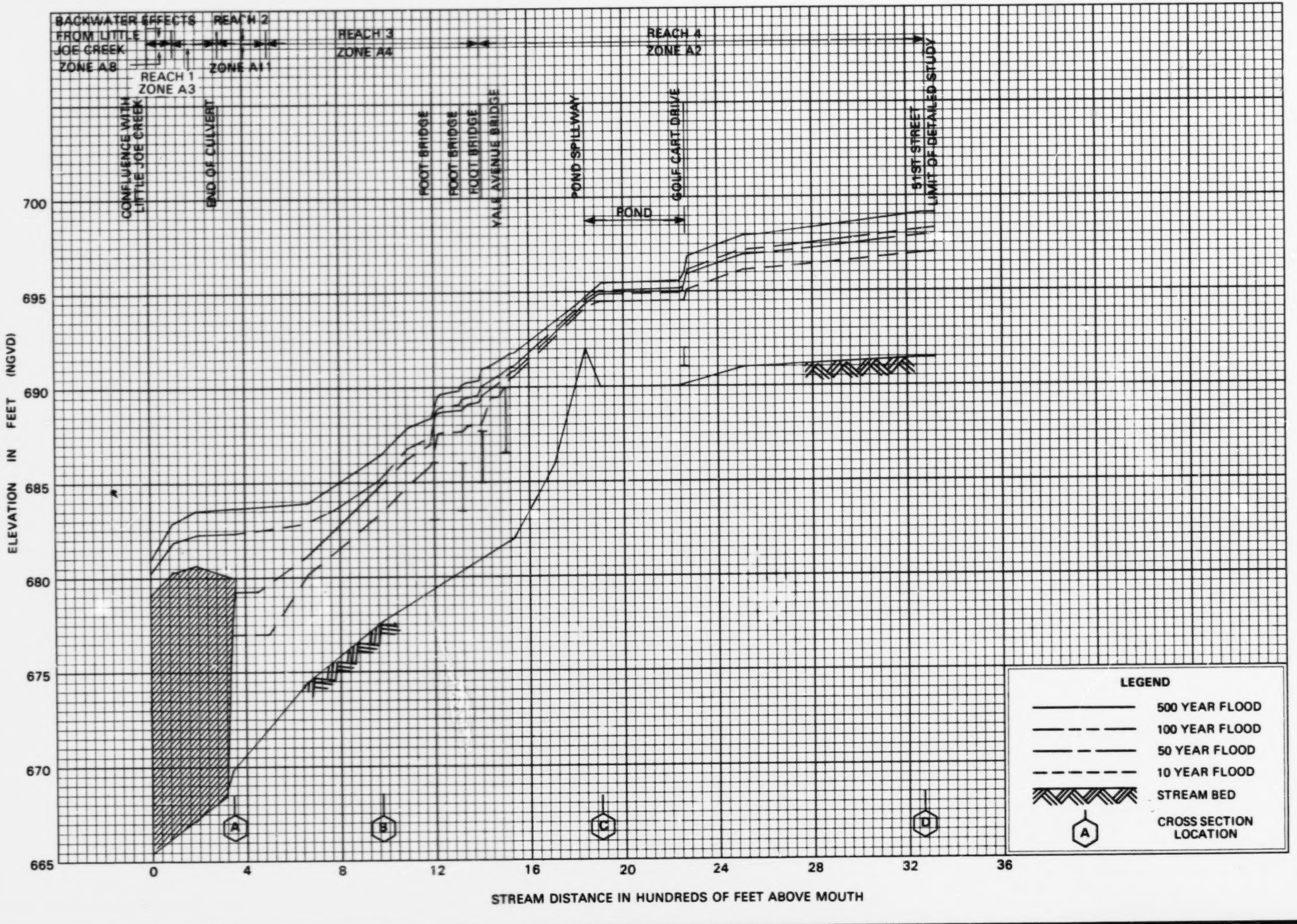
74P

BEST DOCUMENT AVAILABLE



75P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF TULSA, OK (TULSA, OSAGE, AND ROGERS COS.)	FLOOD PROFILES SOUTH FORK LITTLE JOE CREEK

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

NORTH FORK LITTLE JOE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

76P

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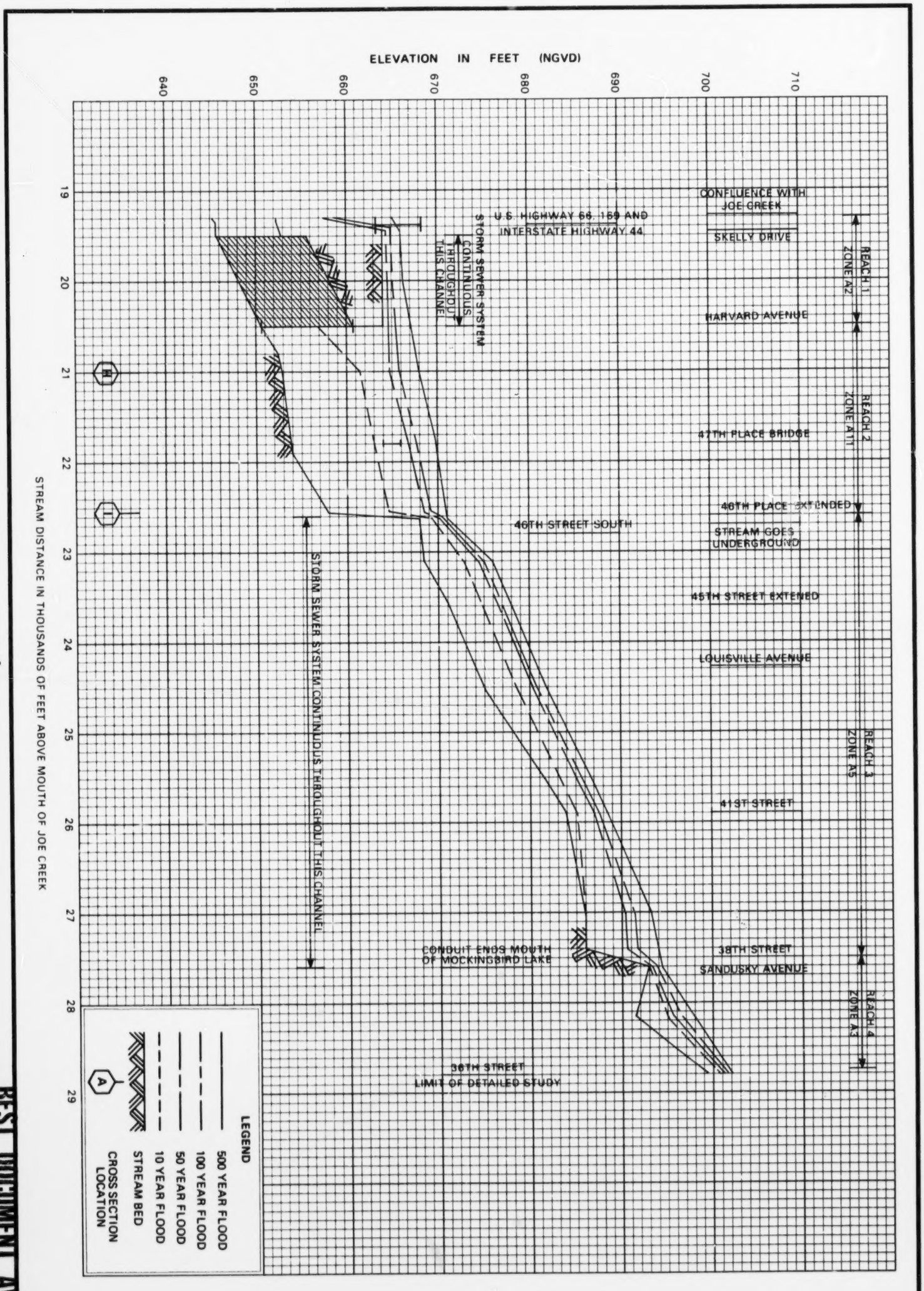


169

BEST DOCUMENT AVAILABLE

77P

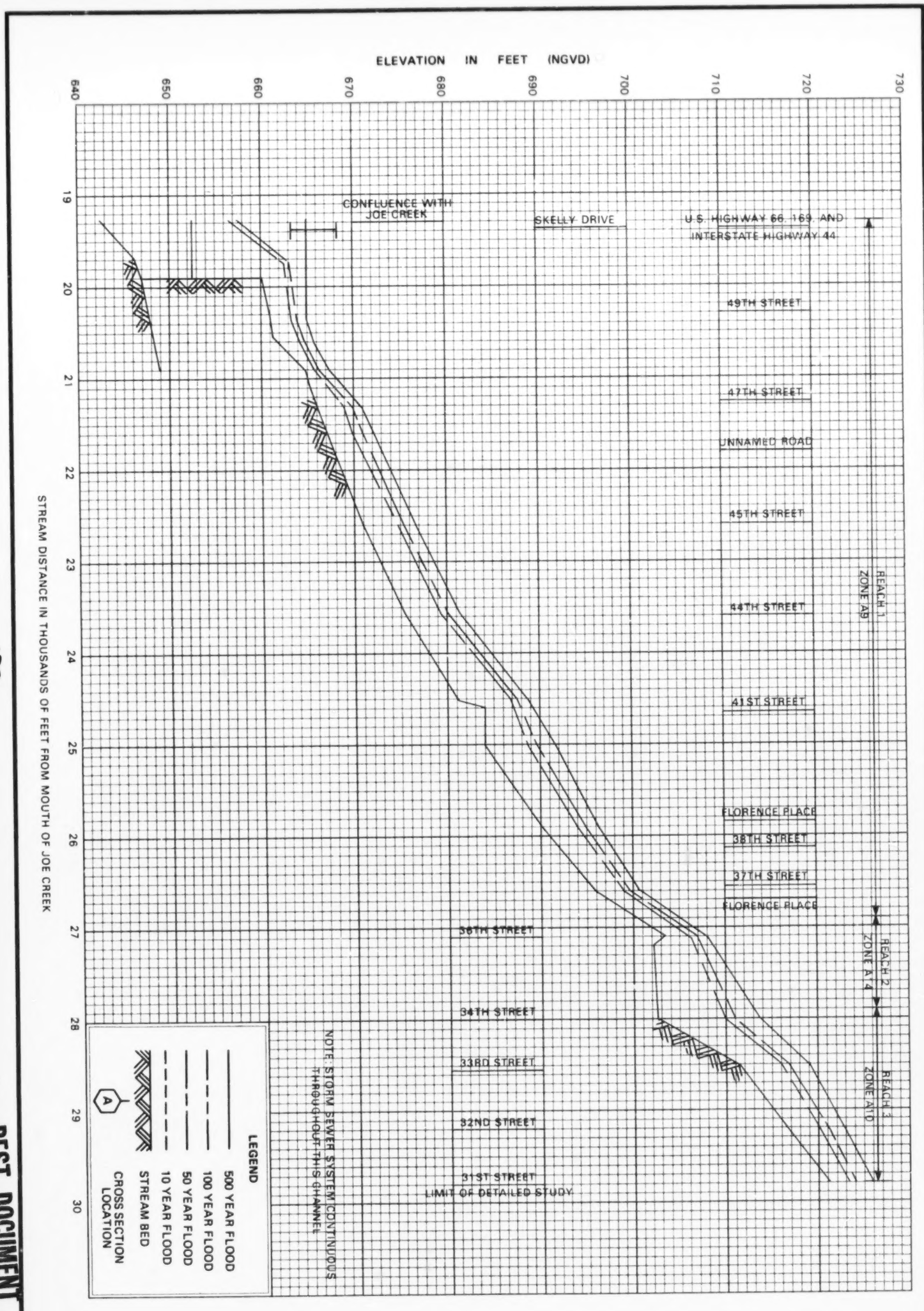
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

EAST BRANCH JOE CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

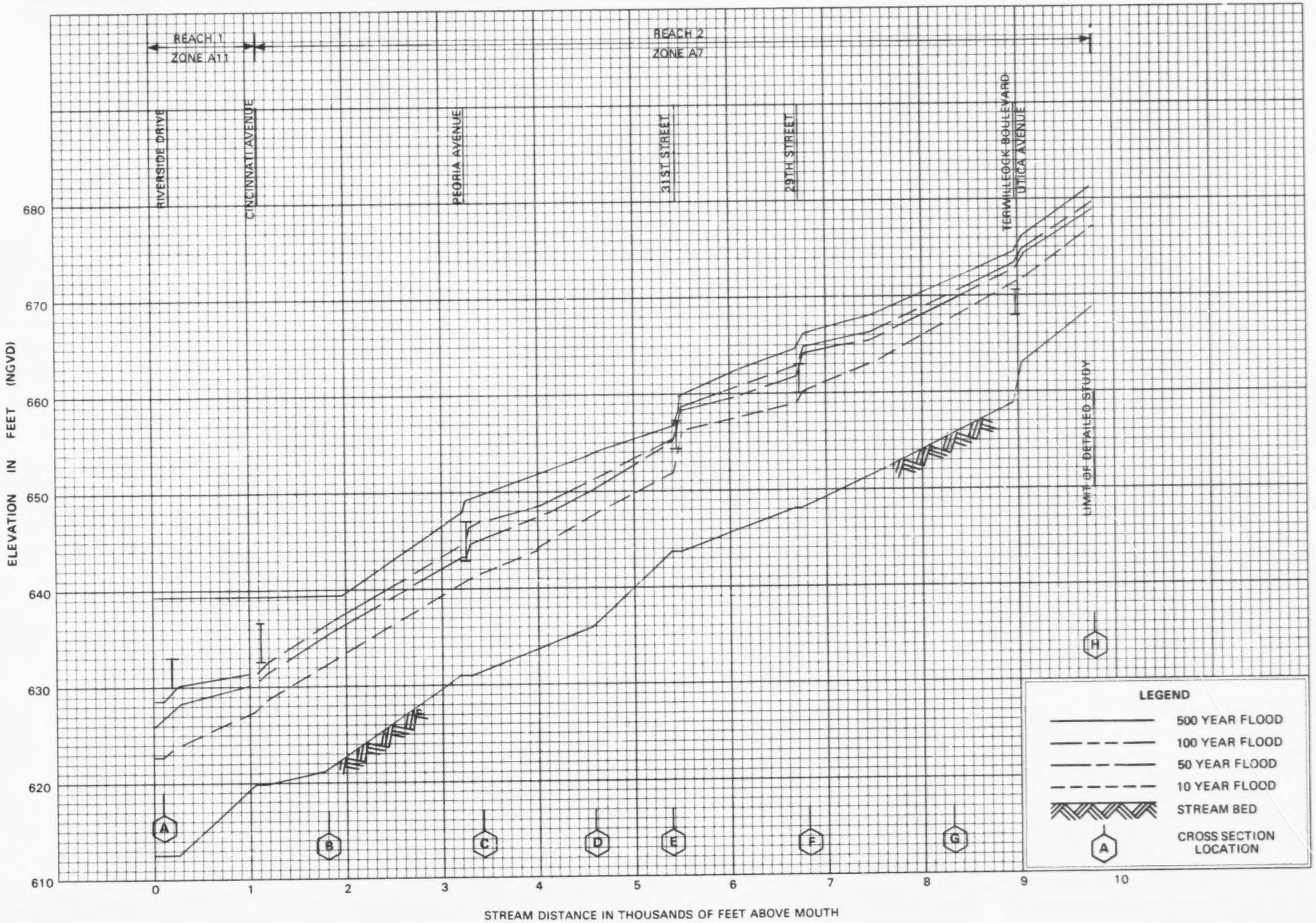
FLOOD PROFILES

WEST BRANCH JOE CREEK

170

78P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

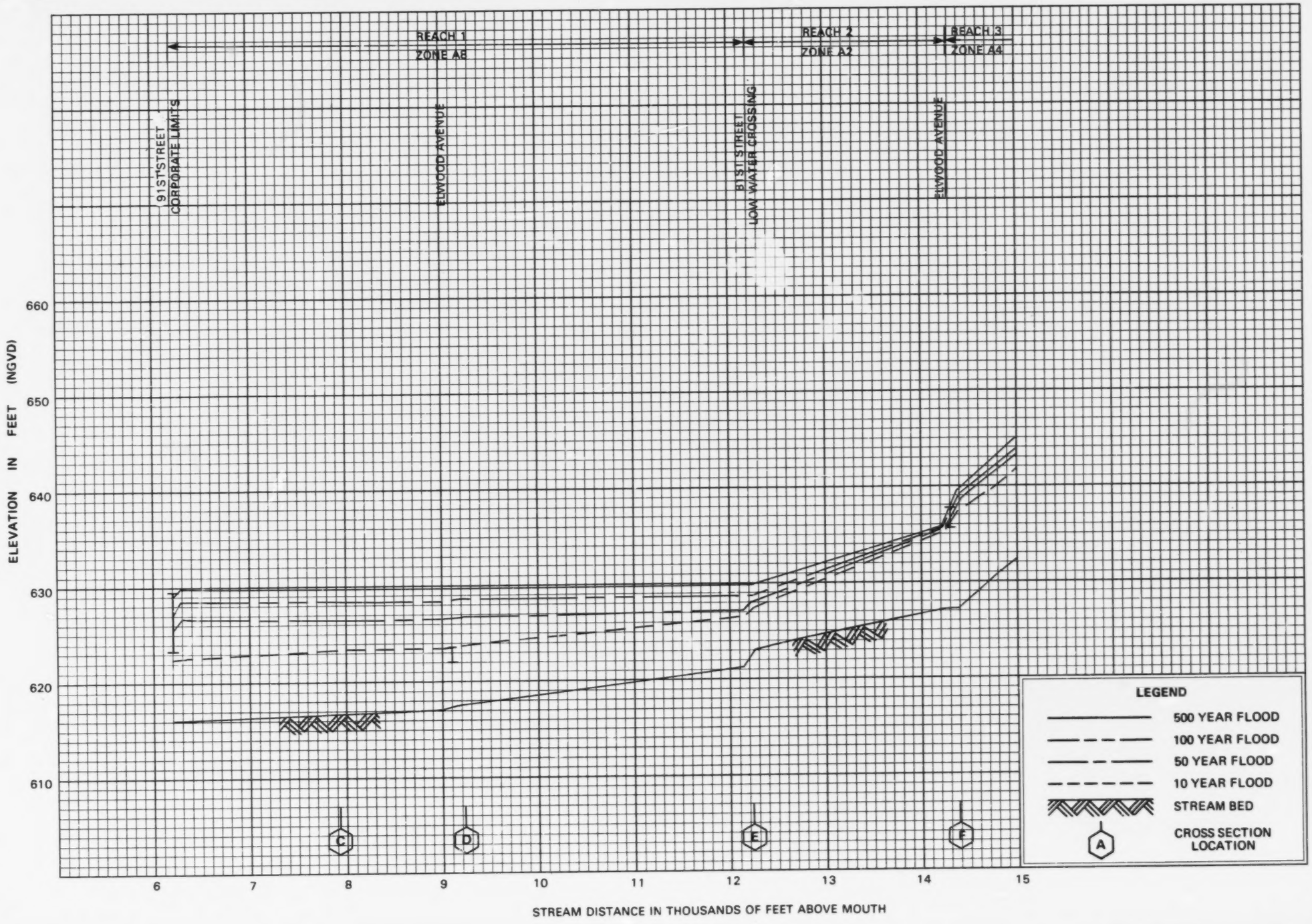
CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

79P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

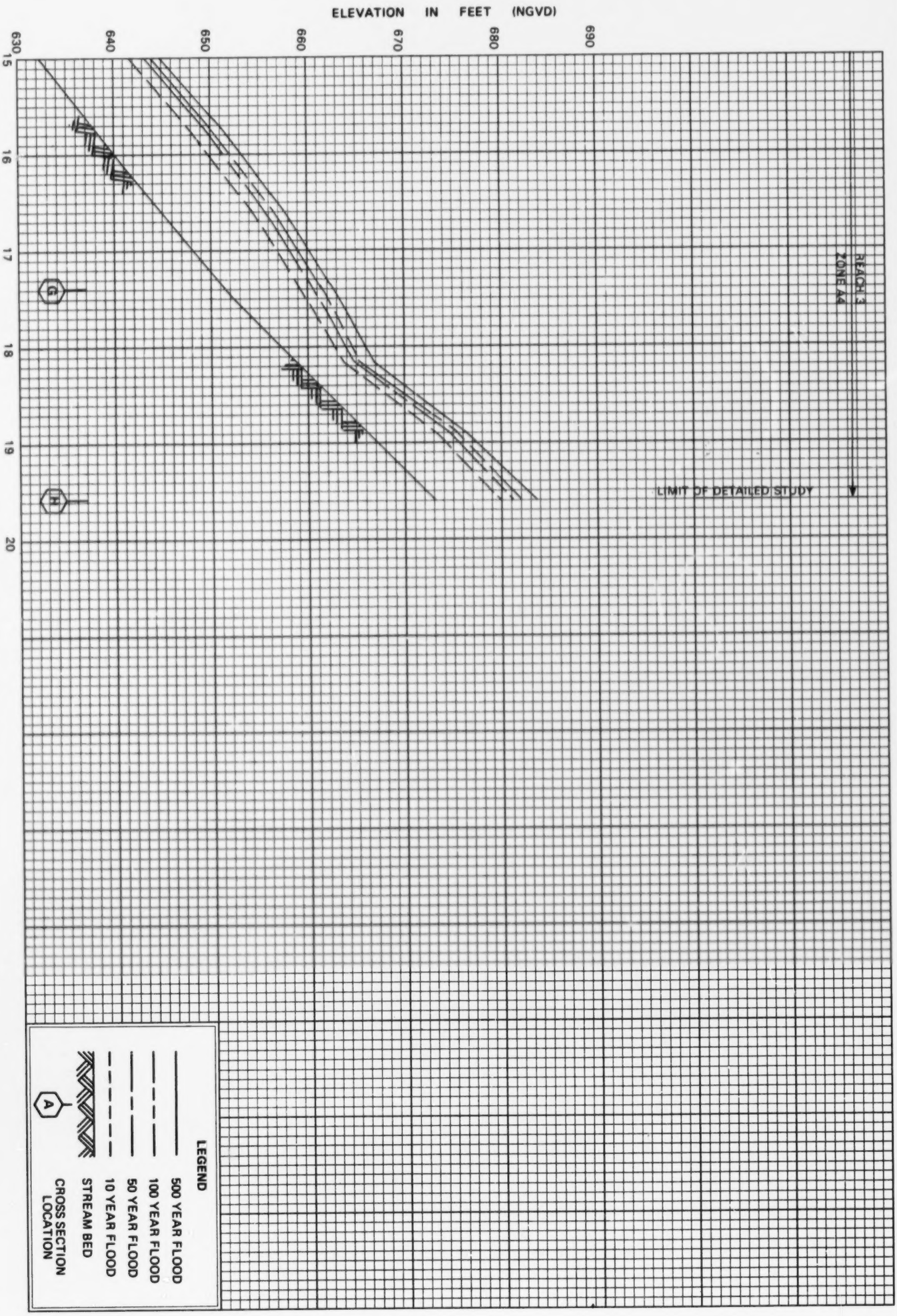
HAGER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

80P

BEST DOCUMENT AVAILABLE



81P

FEDERAL EMERGENCY MANAGEMENT AGENCY

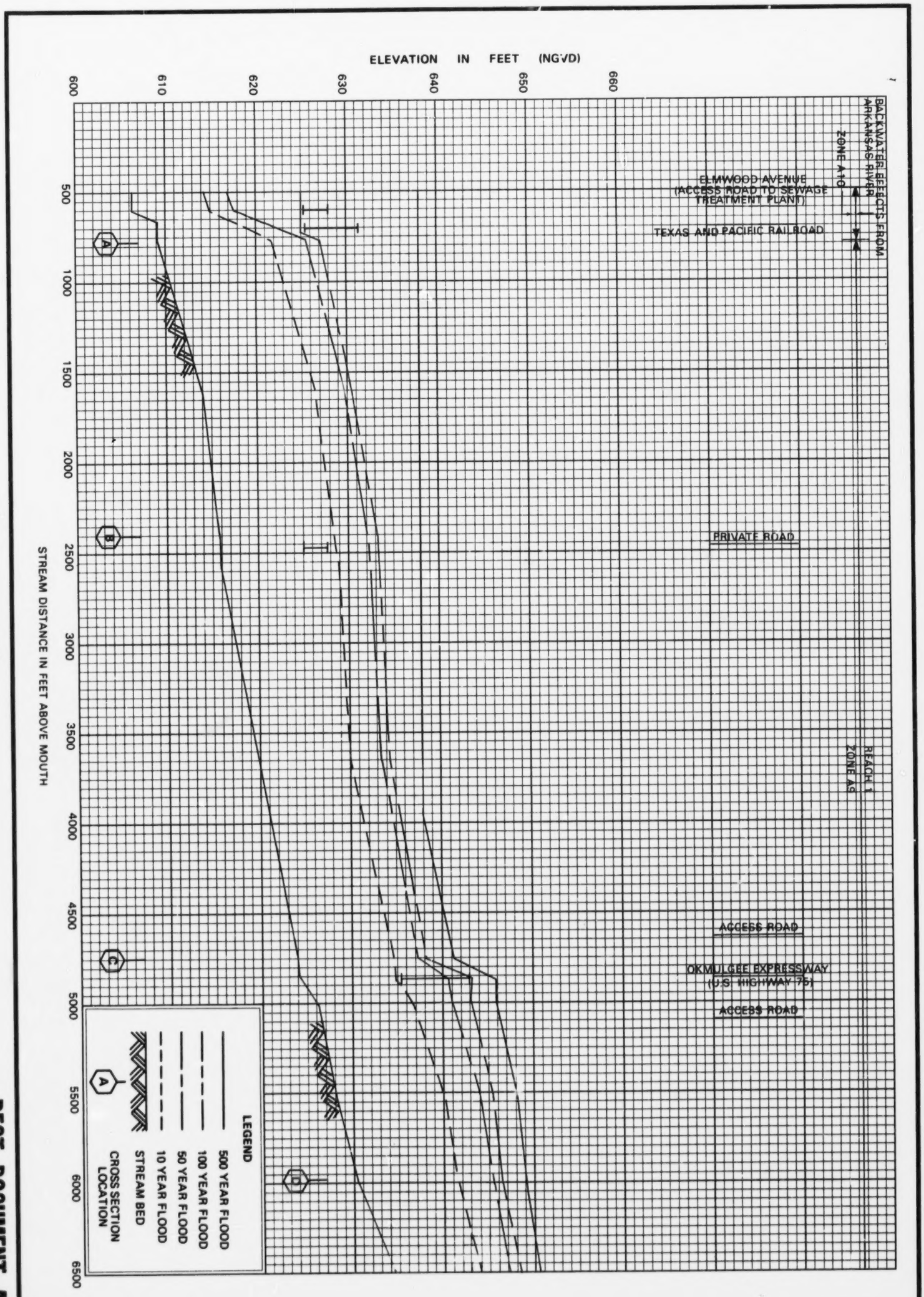
CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

HAGER CREEK

173

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

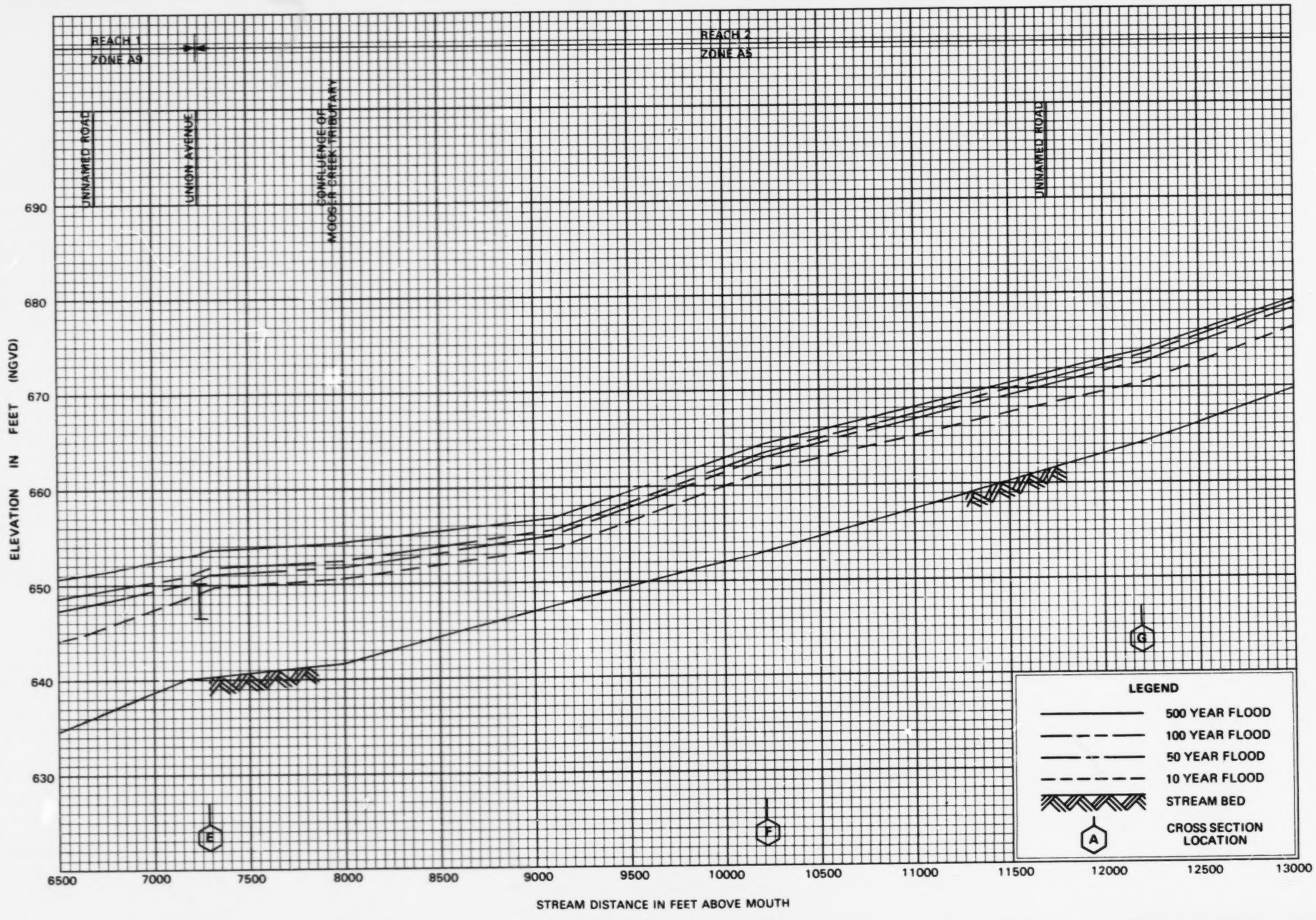
82P

FLOOD PROFILES

MOOSER CREEK

174

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

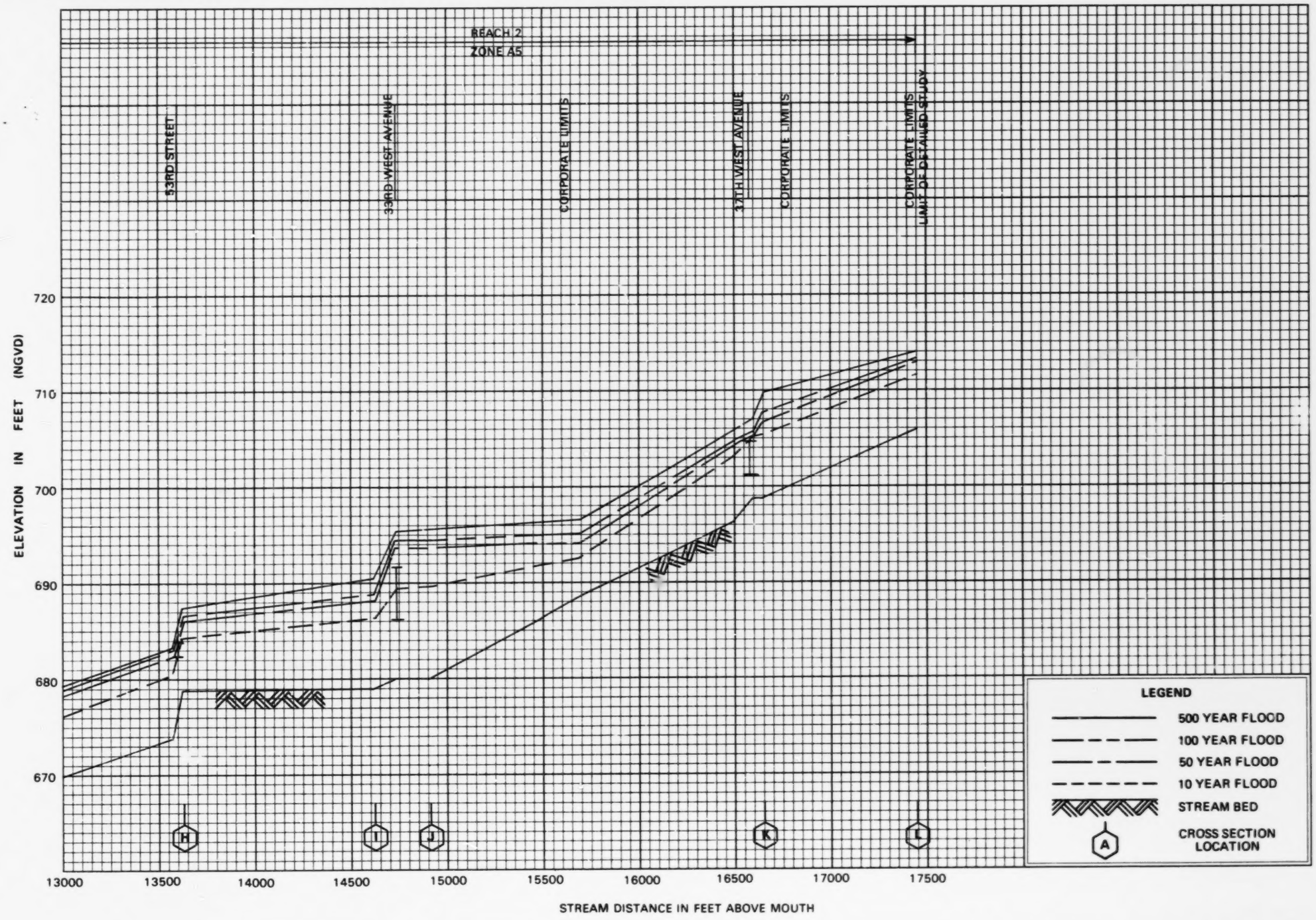
MOOSER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

83P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

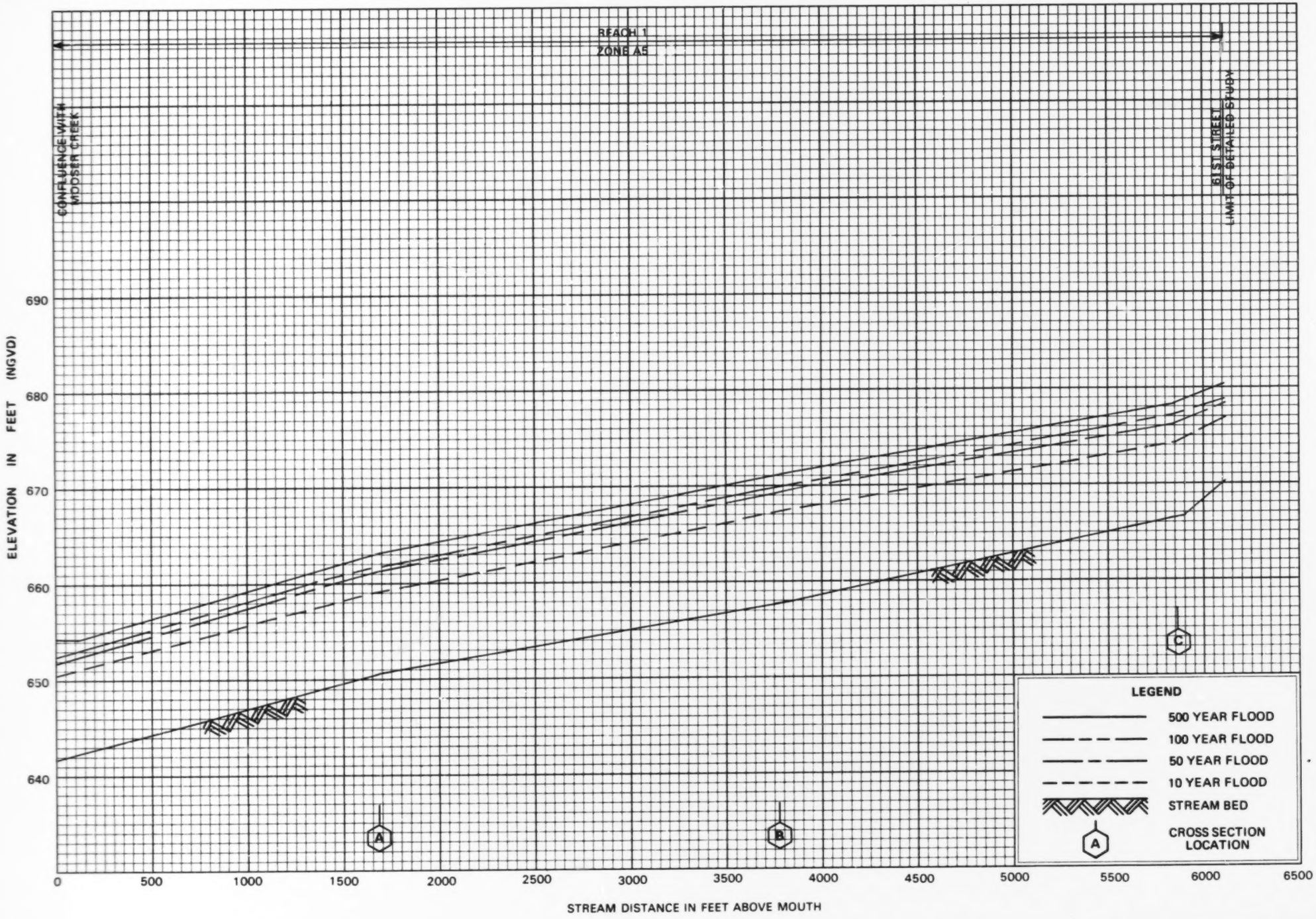
MOOSER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

84P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

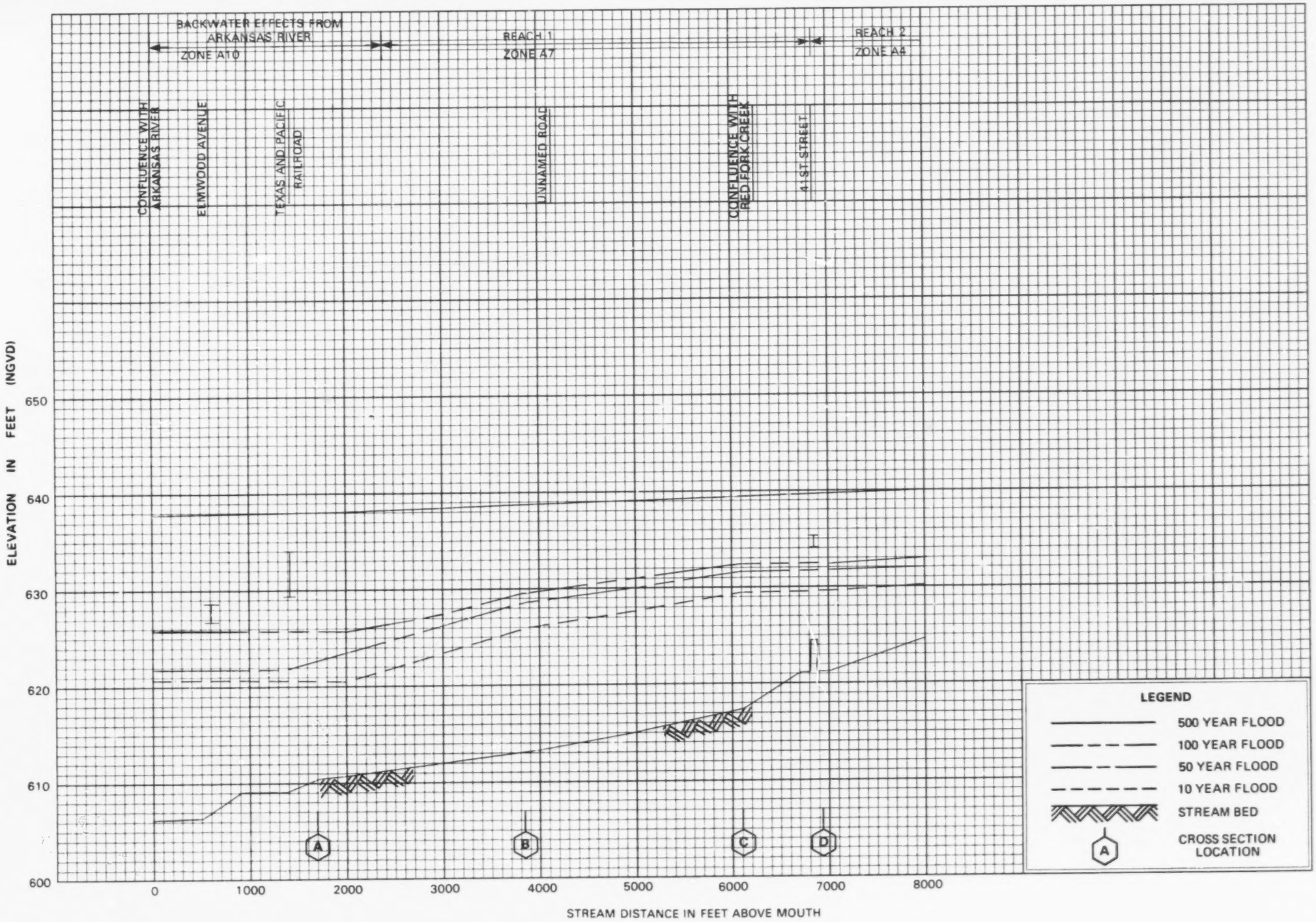
MOOSER CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

85P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

CHERRY CREEK (WEST TULSA)

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

86P

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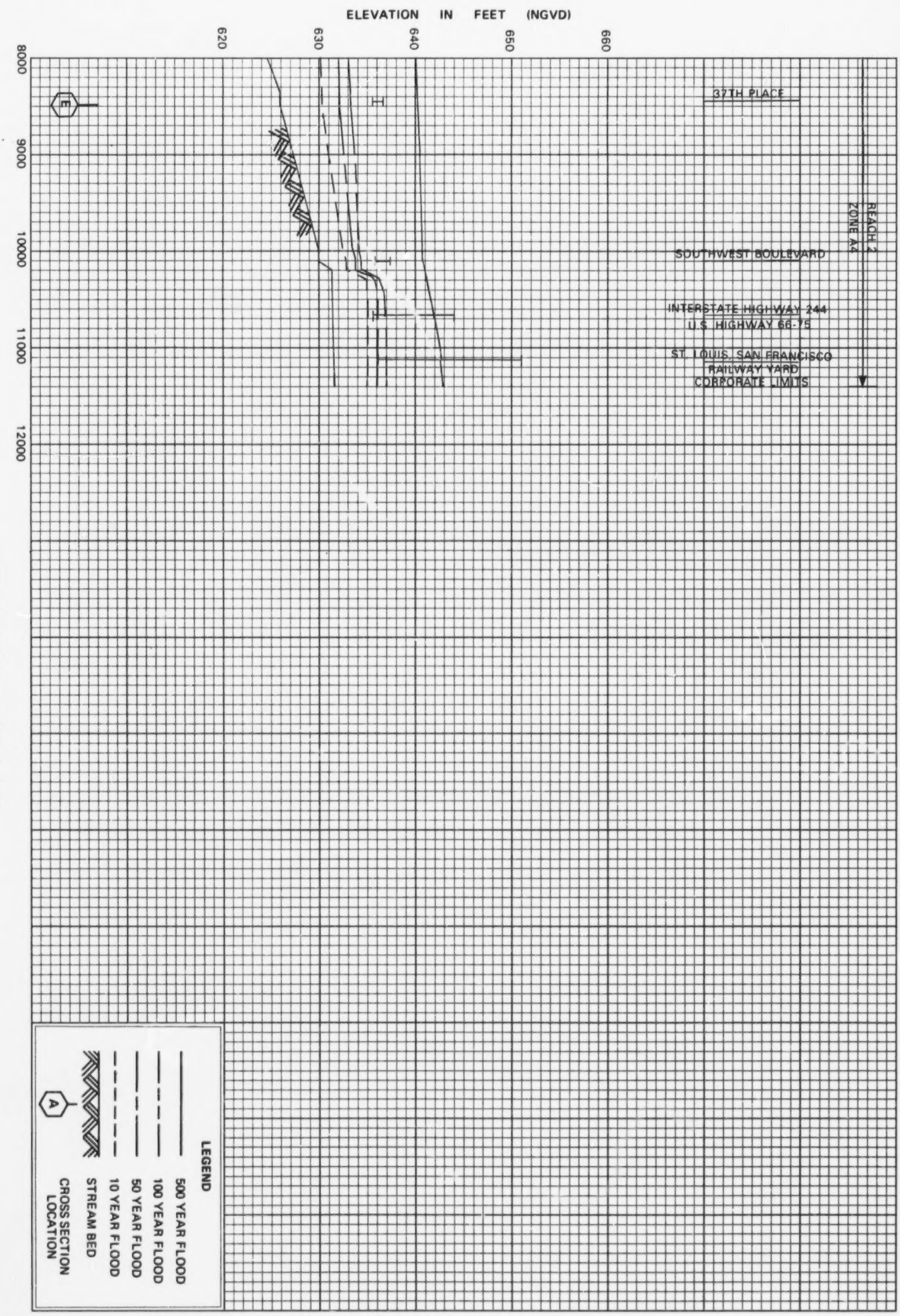

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

CHERRY CREEK (WEST TULSA)

87P

179

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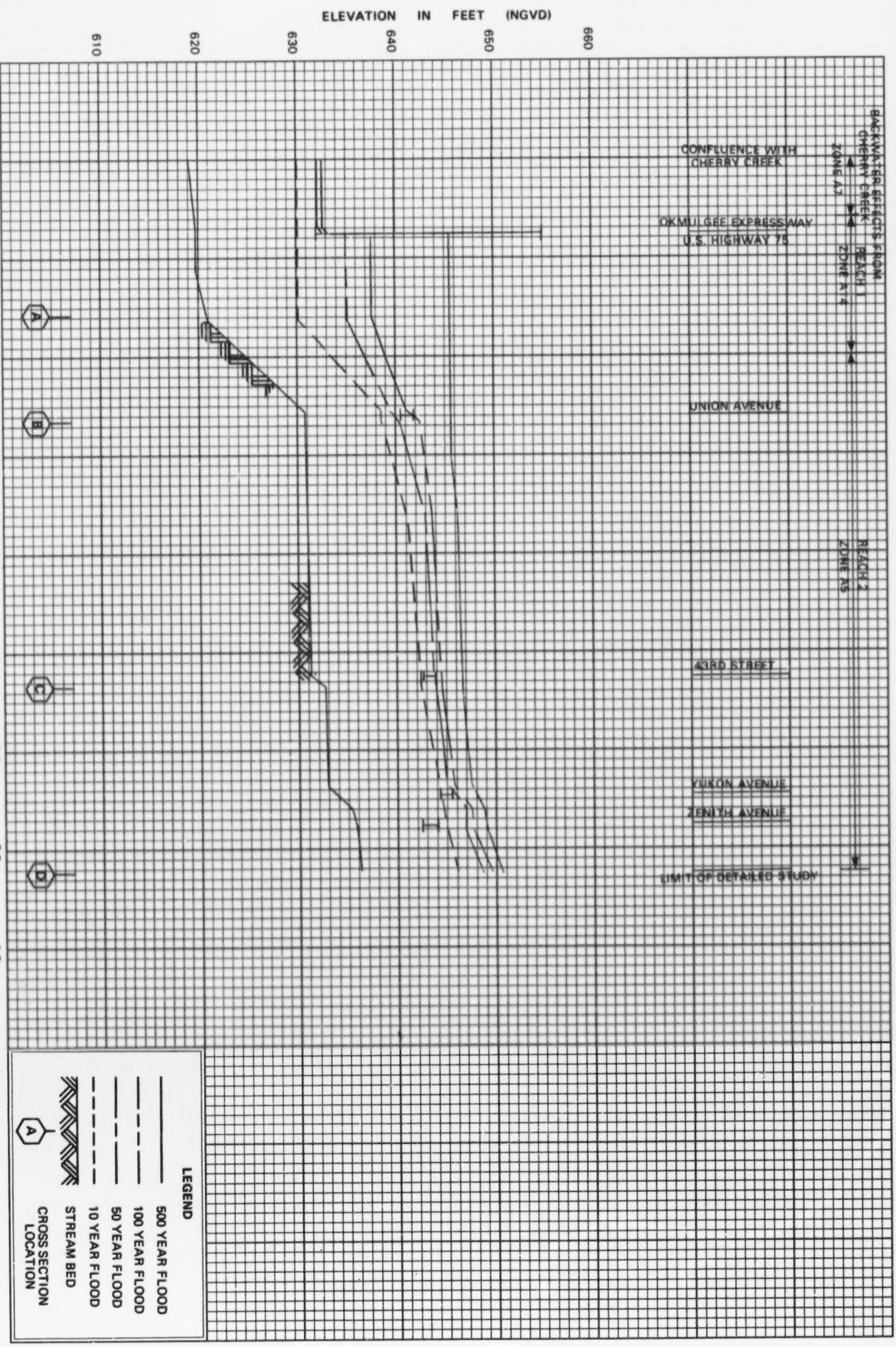


FEDERAL EMERGENCY MANAGEMENT AGENCY

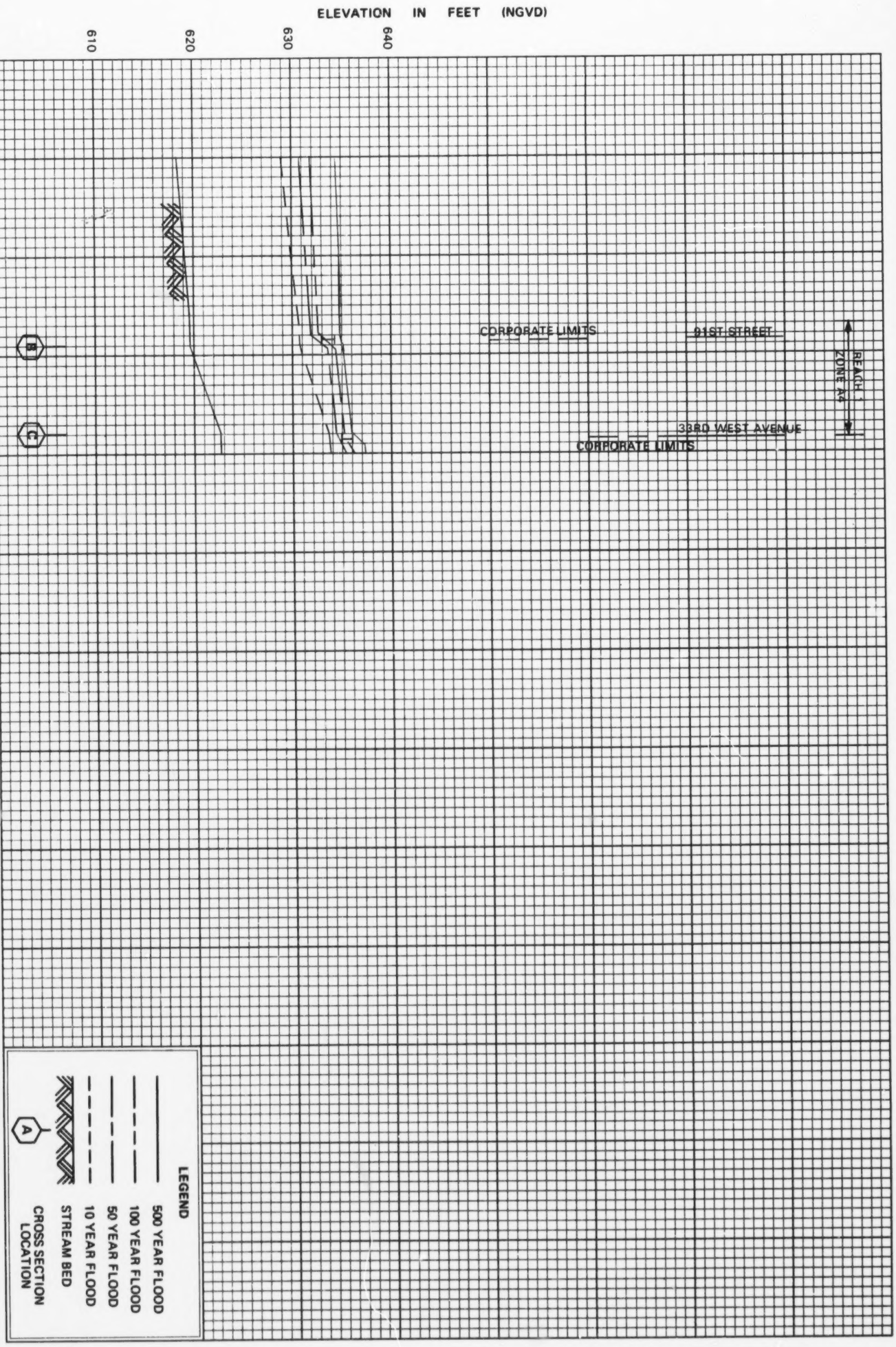
CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

RED FORK CREEK

88P

BEST DOCUMENT AVAILABLE



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

NICKEL CREEK

89P

191

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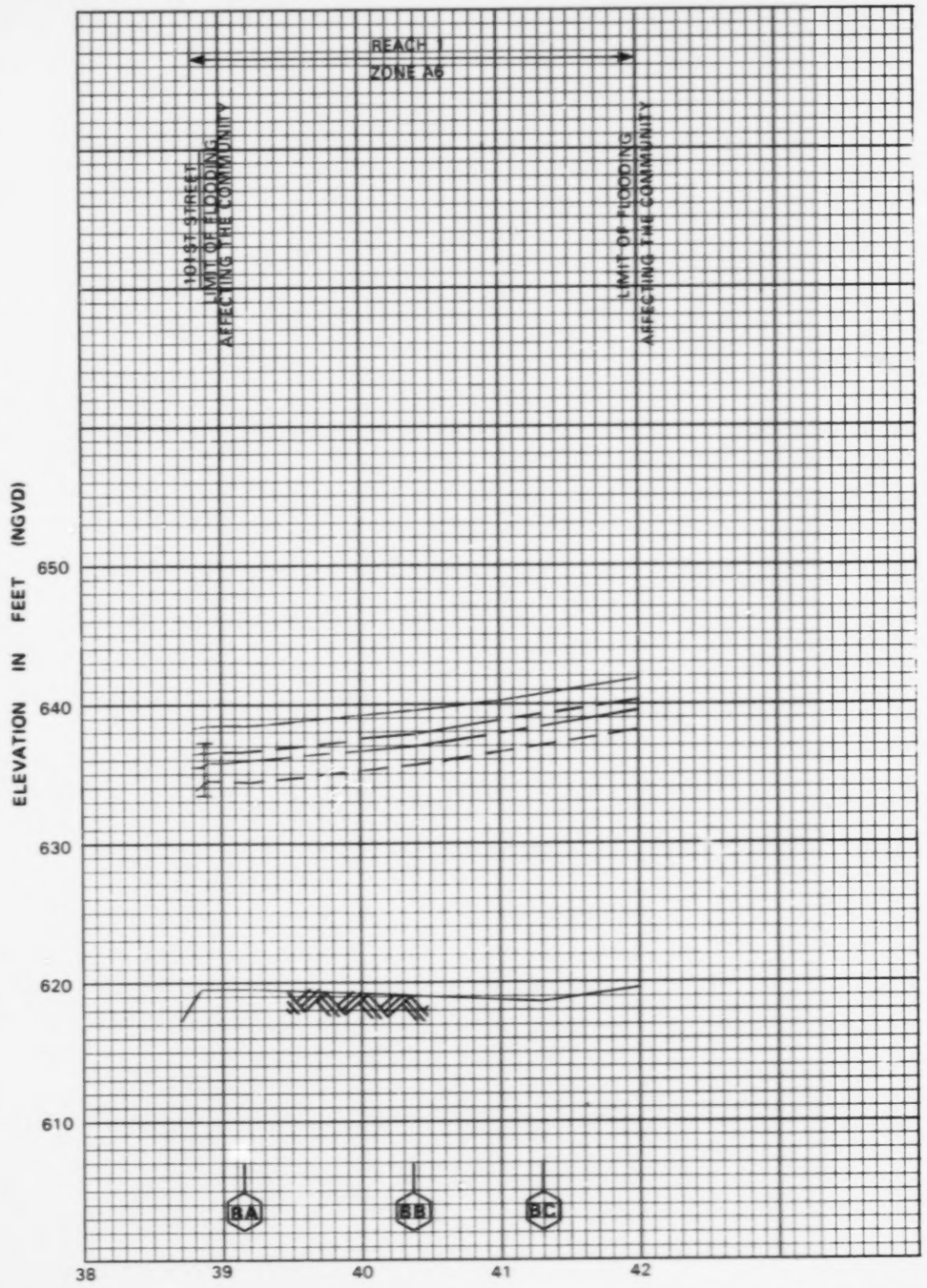

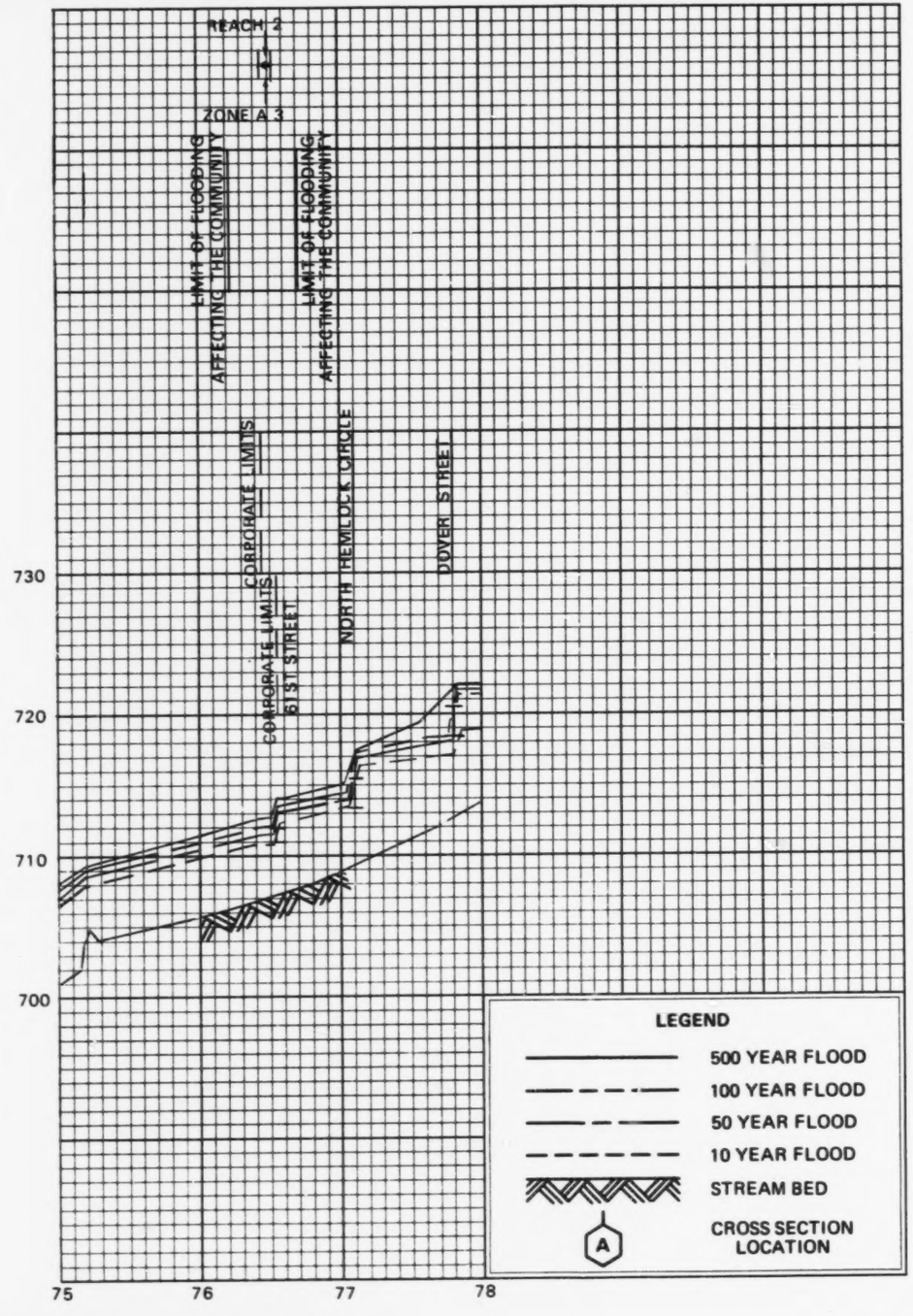

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH ARKANSAS RIVER

FLOOD PROFILES

HAIKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

90P

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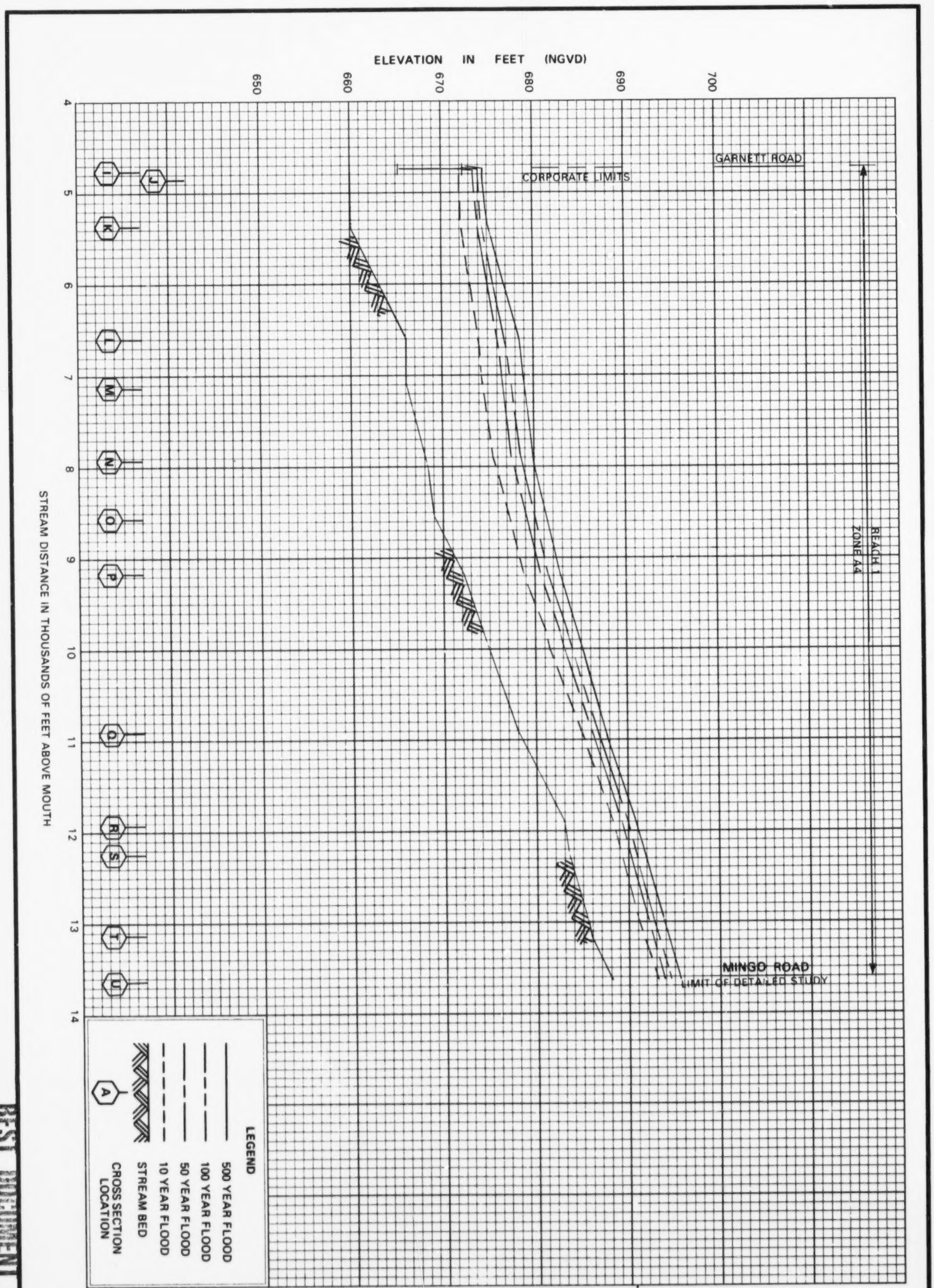

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

WEST BRANCH HAIKEY CREEK

91P

143

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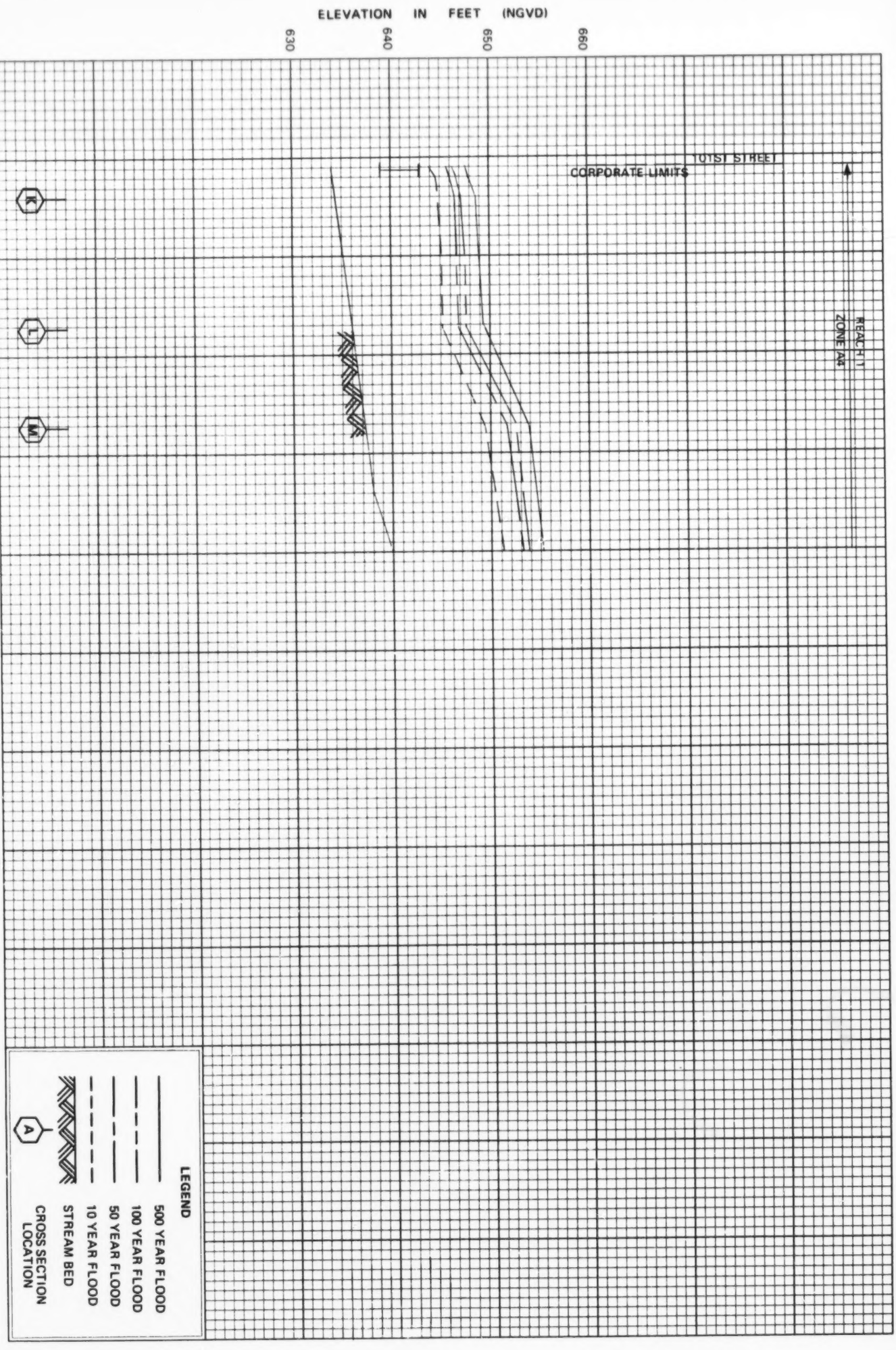

92P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF TULSA, OK** (TULSA, OSAGE, AND ROGERS COS.)	**FLOOD PROFILES** **LITTLE HAIKEY CREEK**

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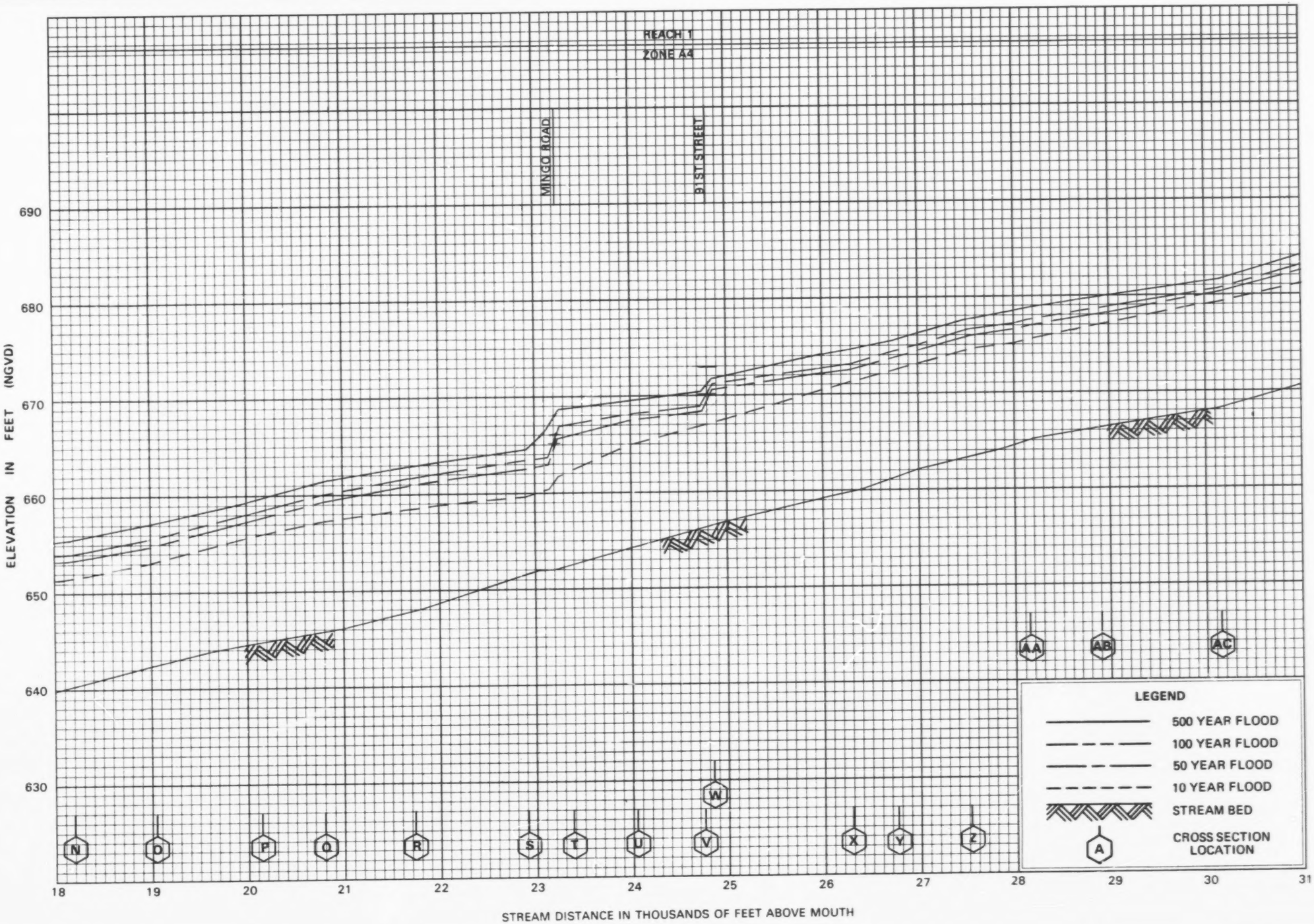

FLOOD PROFILES

LITTLE HAIKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

93P

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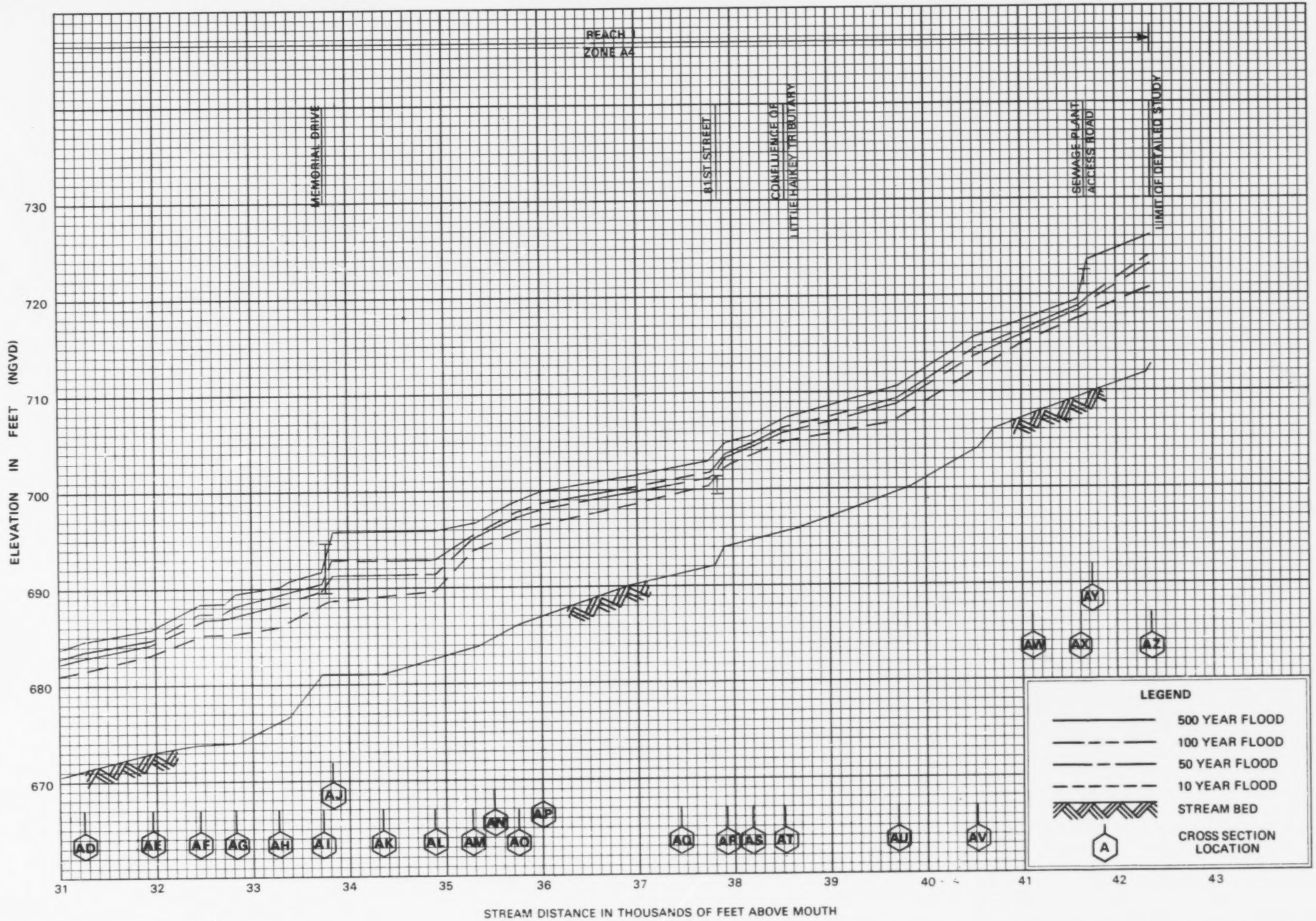

FLOOD PROFILES

LITTLE HAIKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

94P

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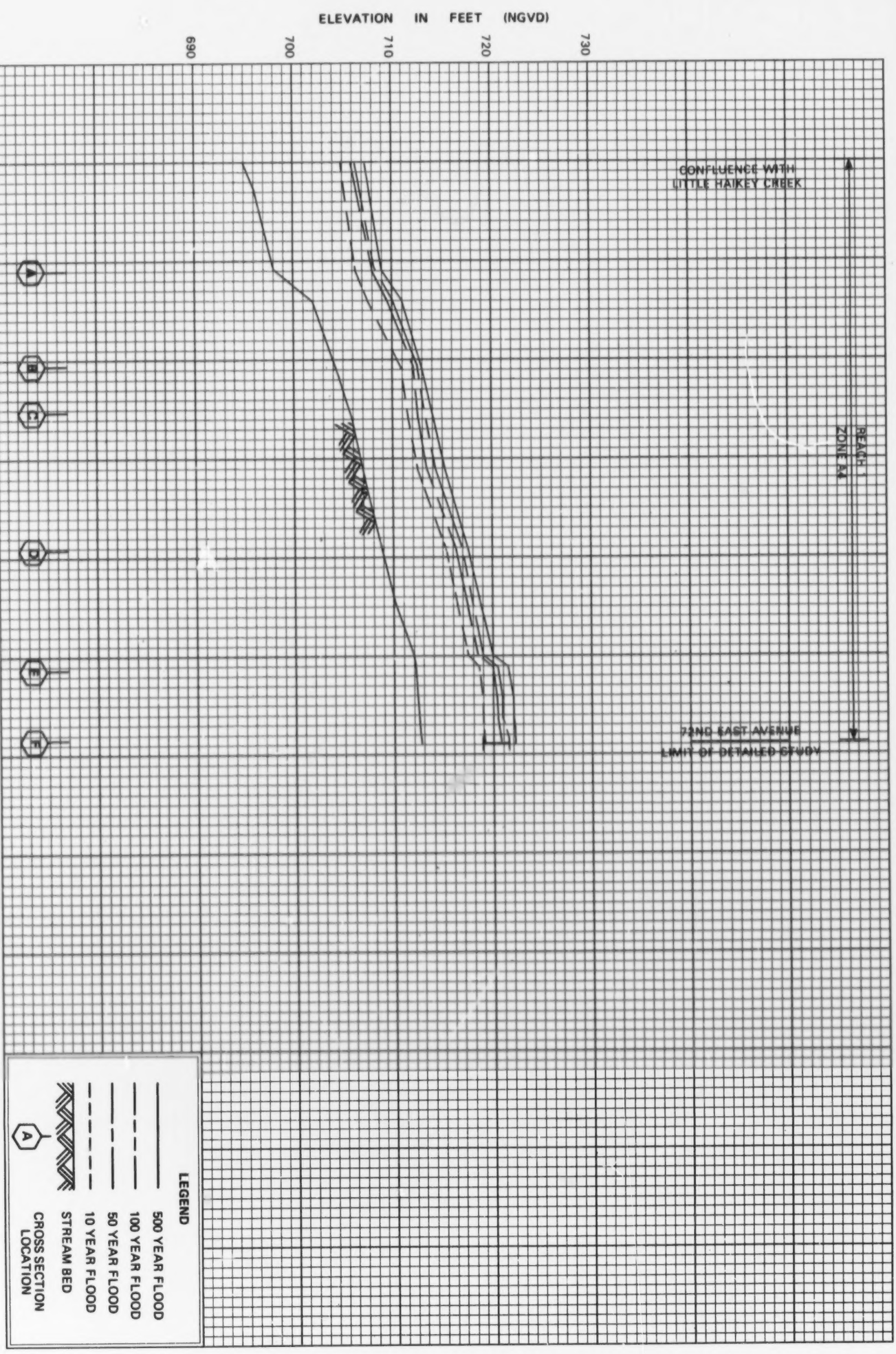

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK
(TULSA, OSAGE, AND ROGERS COS.)

95P

FLOOD PROFILES

LITTLE HAIKEY CREEK TRIBUTARY

187

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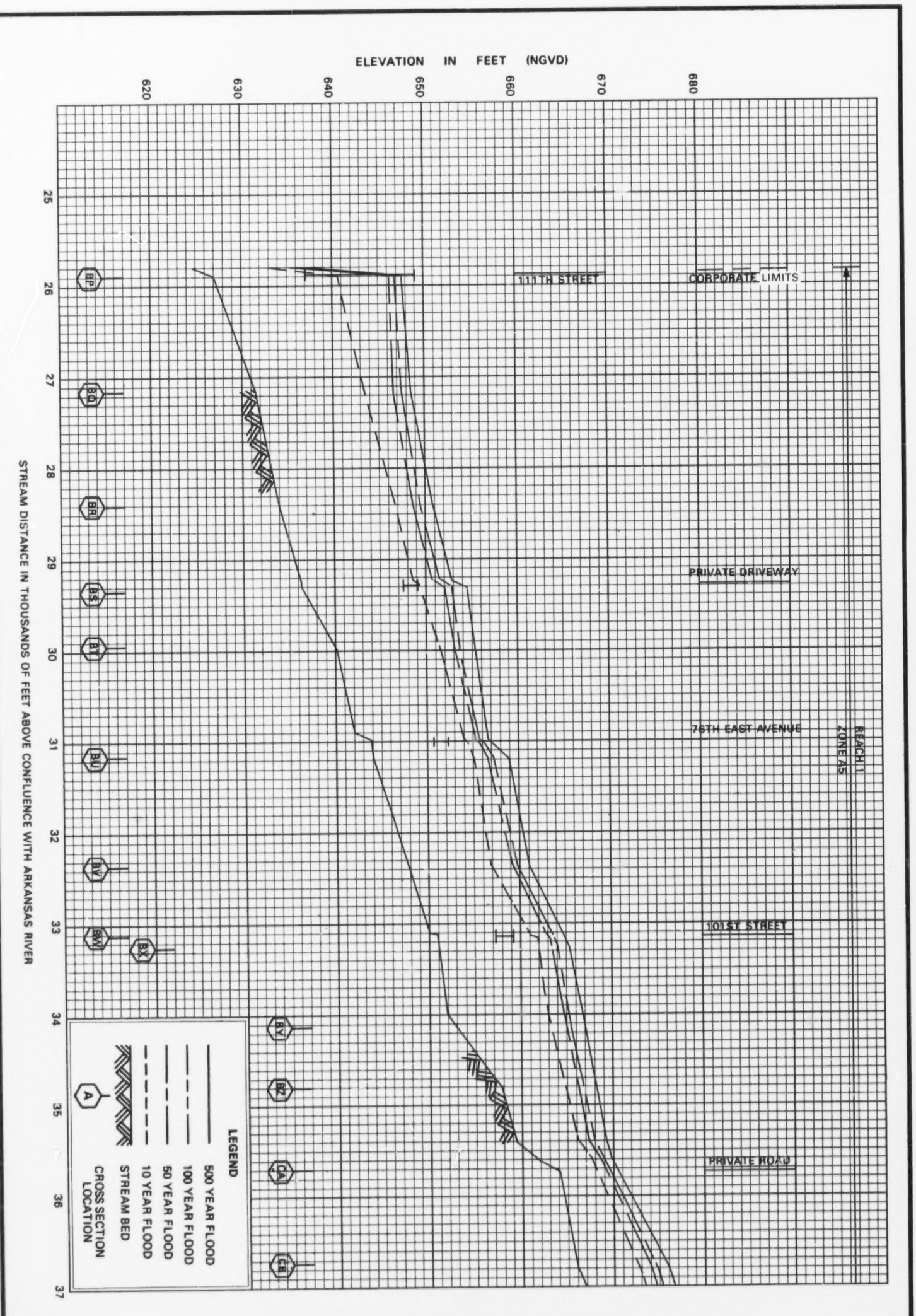

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TULSA, OK

(TULSA, OSAGE, AND ROGERS COS.)

FLOOD PROFILES

FRY DITCH NO. 2

96P

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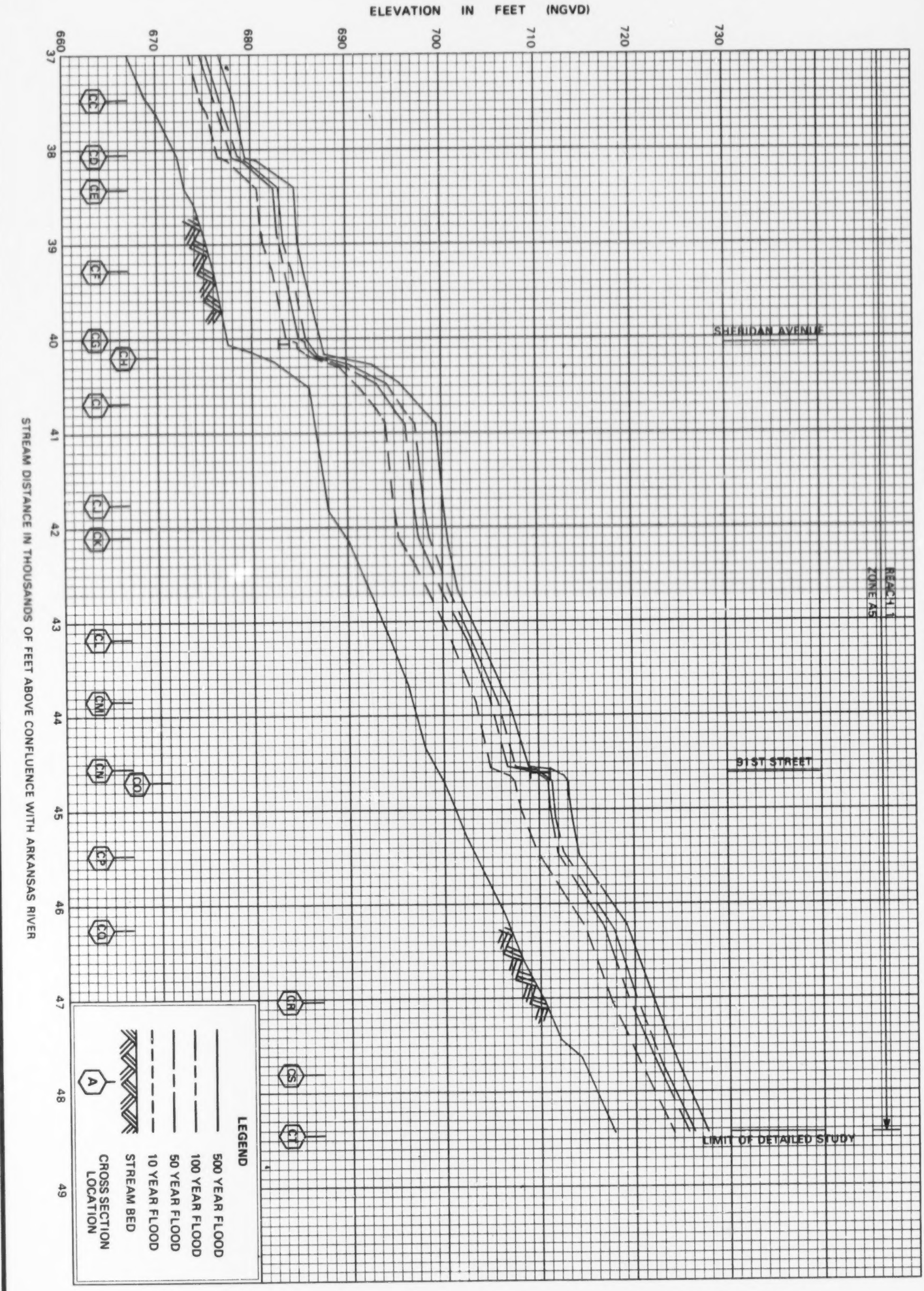

97P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF TULSA, OK** (TULSA, OSAGE, AND ROGERS COS.)	**FLOOD PROFILES** **FRY DITCH NO. 2**

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